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AGRICULTURE, 1954
A GRAPHIC SUMMARY
(A Cooperative Report)

SPECIAL REPORTS

1954 Census of Agriculture

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U. S. DEPARTMENT OF COMMERCE
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AGRICULTURAL RESEARCH SERVICE

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United States Census of Agriculture: 1954

OCT 3 - 1957

Volume III
SPECIAL REPORTS
Part 4

Agriculture, 1954, A Graphic Summary
(A Cooperative Report)

LAND UTILIZATION • FARM MACHINERY and FACILITIES • FARM TENURE

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PREFACE

Volume III, Special Reports, comprises a group of special compilations and summaries of data from the 1954 Census of Agriculture and related surveys. Part 4 of Volume III, "Agriculture 1954, A Graphic Summary," presents in graphic form some of the significant facts regarding farms, land use, farm tenure, and farm power and machinery as shown by the 1954 Census of Agriculture.

This report has been prepared cooperatively by the Bureau of the Census, U. S. Department of Commerce, and the Agricultural Research Service, U. S. Department of Agriculture.

Chapter 1 presents some of the significant facts regarding the uses being made of agricultural land both inside and outside of farm boundaries, and changes and developments in the use of agricultural lands. This chapter was written by James R. Anderson, Agricultural Economist, Production Economics Research Branch, Agricultural Research Service, U. S. Department of Agriculture.

Agricultural production during the present century has been greatly influenced by the mechanization of farms. Chapter 2 presents some of the significant facts regarding the extent of use of farm power, machinery and facilities on farms, and changes and developments during recent years. This chapter was written by Martin R. Cooper, assisted by Joe F. Davis, Paul E. Strickler, Albert P. Brodell, and Julius J. Csorba, Agricultural Economists, Production Economics Research Branch, Agricultural Research Service, U. S. Department of Agriculture.

Chapter 3 provides some of the significant facts regarding the extent and general nature of the various forms of tenure under which farms are held and operated, and the changes and developments in farm tenure, especially during the last two decades. This chapter was prepared by Gene L. Wunderlich, Agricultural Economist, assisted by Marie B. Harmon, Production Economics Research Branch, Agricultural Research Service, U. S. Department of Agriculture, and by Hilton E. Robison, Supervisory Statistician, Bureau of the Census, U. S. Department of Commerce.

The preparation of these reports was under the supervision of Ray Hurley, Chief of the Agriculture Division of the Bureau of the Census, U. S. Department of Commerce. Charles F. Frazier, Ethel Lund, Olive K. Britt, Emile Hooker, and Henry A. Tucker assisted in the preparation of maps, charts, and other materials. Most of the maps were prepared under the supervision of Clarence E. Batschelet, Geographer, Bureau of the Census, U. S. Department of Commerce.

December 1956.

UNITED STATES CENSUS OF AGRICULTURE: 1954

REPORTS

Volume I.—Counties and State Economic Areas. Statistics for counties include number of farms, acreage, value, and farm operators; farms by color and tenure of operator; facilities and equipment; use of commercial fertilizer; farm labor; farm expenditures; livestock and livestock products; specified crops harvested; farms classified by type of farm and by economic class; and value of products sold by source.

Data for State economic areas include farms and farm characteristics by tenure of operator, by type of farm, and by economic class.

Volume I is published in 33 parts as follows:

Part	State or States	Part	State or States	Part	State or States
1	New England States:		West North Central:		East South Central—Continued
	Maine.	8	Minnesota.	21	Alabama.
	New Hampshire.	9	Iowa.	22	Mississippi.
	Vermont.	10	Missouri.		West South Central:
	Massachusetts.	11	North Dakota and South Dakota.	23	Arkansas.
	Rhode Island.			24	Louisiana.
	Connecticut.	12	Nebraska.	25	Oklahoma.
2	Middle Atlantic States:	13	Kansas.	26	Texas.
	New York.		South Atlantic:		Mountain:
	New Jersey.	14	Delaware and Maryland.	27	Montana.
	Pennsylvania.	15	Virginia and West Virginia.	28	Idaho.
	East North Central.	16	North Carolina and South Carolina.	29	Wyoming and Colorado.
3	Ohio.			30	New Mexico and Arizona.
4	Indiana.	17	Georgia.	31	Utah and Nevada.
5	Illinois.	18	Florida.		Pacific:
6	Michigan.		East South Central:	32	Washington and Oregon.
7	Wisconsin.	19	Kentucky.	33	California.
		20	Tennessee.		

Volume II.—General Report. Statistics by Subjects, United States Census of Agriculture, 1954. Summary data and analyses of the data for States, for Geographic Divisions, and for the United States by subjects as illustrated by the chapter titles listed below:

Chapter	Title	Chapter	Title
I	Farms and Land in Farms.	VII	Field Crops and Vegetables.
II	Age, Residence, Years on Farm, Work Off Farm.	VIII	Fruits and Nuts, Horticultural Specialties, Forest Products.
III	Farm Facilities, Farm Equipment.	IX	Value of Farm Products.
VI	Farm Labor, Use of Fertilizer, Farm Expenditures, and Cash Rent.	X	Color, Race, and Tenure of Farm Operator.
V	Size of Farm.	XI	Economic Class of Farm.
VI	Livestock and Livestock Products.	XII	Type of Farm.

Volume III.—Special Reports

Part 1.—Multiple-unit Operations. This report will be similar to Part 2 of Volume V of the reports for the 1950 Census of Agriculture. It will present statistics for approximately 900 counties and State economic areas in 12 Southern States and Missouri for the number and characteristics of multiple-unit operations and farms in multiple units.

Part 2.—Ranking Agricultural Counties. This special report will present statistics for selected items of inventory and agricultural production for the leading counties in the United States.

Part 3.—Alaska, Hawaii, Puerto Rico, District of Columbia, and U. S. Possessions. These areas were not included in the 1954 Census of Agriculture. The available current data from various Government sources will be compiled and published in this report.

Part 4.—Agriculture, 1954, a Graphic Summary. This report will present graphically some of the significant facts regarding agriculture and agricultural production as revealed by the 1954 Census of Agriculture.

Part 5.—Farm-mortgage Debt. This will be a cooperative study by the Agricultural Research Service of the U. S. Department of Agricluture and the Bureau of the Census. It will present, by States, data based on the 1954 Census of Agriculture and a special mail survey to be conducted in January 1956, on the number of mortgaged farms, the amount of mortgage debt, and the amount of debt held by principal lending agencies.

Part 6.—Irrigation in Humid Areas. This cooperative report by the Agricultural Research Service of the U. S. Department of Agriculture and the Bureau of the Census will present data obtained by a mail survey of operators of irrigated farms in 28 States on the source of water, method of applying water, number of pumps used, acres of crops irrigated in 1954 and 1955, the number of times each crop was irrigated, and the cost of irrigation equipment and the irrigation system.

Part 7.—Popular Report—The American Farmer in 1954. This report is planned to be a general, easy-to-read publication for the general public on the status and broad characteristics of United States agriculture.

Part 8.—Size of Operation by Type of Farm. This will be a cooperative special report to be prepared in cooperation with the Agricultural Research Service of the U. S. Department of Agriculture. This report will contain data for 119 economic subregions, (essentially general type-of-farming areas) showing the general characteristics for each type of farm by economic class. It will provide data for a current analysis of the differences that exist among groups of farms of the same type. It will furnish statistical basis for a realistic examination of production of such commodities as wheat, cotton, and dairy products in connection with actual or proposed governmental policies and programs.

CHAPTER 1

LAND UTILIZATION

CONTENTS

	Page
Introduction	5
Sources of data	5
Scope, definitions, and explanations	5
Major uses of land	6
Land use—1954	7
Changes in land use	8
Regional trends in land use	9
Cropland	11
Pastureland	15
Woodland and forest land	17
Regional patterns of land resources and uses	19
Type of farming	20
Major land-use regions	22
Major uses of all land by farm-production regions	23
Major uses of nonfarmland by farm-production regions	24
Land capability by farm-production regions	25
Conservation, development, and improvement of land resources	26
Irrigated land	27
Drainage	29
Land clearing and brush control	30
Pasture improvement	31
Soil-conserving practices	32
Farm resources and production	34
Farms and farmland	35
Farm population	41
Power and equipment	42
Agricultural production	44
Principal crops	49
Livestock	54

CHARTS AND MAPS

	Page
Farm production regions	5
Map of the United States, showing geographic regions and divisions	5
Major uses of land, 1954	7
The trend in land utilization	8
Land in farms, agricultural land and cropland harvested, by regions, 1880–1954	9
Total cropland, acreage, 1954	10
Cropland harvested, acreage, 1954	10
Cropland used only for pasture, acreage, 1954	10
Cropland not harvested and not pastured, acreage, 1954	10
Cultivated summer fallow, acreage, 1954	10
Cropland harvested—increase and decrease, in acreage, 1949–1954	11
Cropland harvested—increase and decrease, in acreage, 1899–1949	11
All land in farms and cropland harvested, for the United States: 1850–1954	11
Cropland as a percent of total land area, 1954	12
Total cropland as a percent of all land in farms, 1954	13
Cropland harvested as a percent of the total land area, 1954	14
Uses of cropland harvested	14
Total land pastured, acreage, 1954	15
Cropland used only for pasture, acreage, 1954	15
Pasture other than cropland and woodland, acreage, 1954	15
Pasture and grazing land: 1900–1954	16
Woodland pastured, acreage, 1954	16
Farm operators with grazing permits, number, April 1, 1950	16
Distribution of forest land, acreage, 1953	17
Woodland in farms, acreage, 1954	18
Woodland pastured, acreage, 1954	18
Woodland not pastured, acreage, 1954	18
Major types of farming in the United States	20
Type-of-farming areas, based on type accounting for 50 percent or more of commercial farms, 1954	21
Major land use regions	22
Major uses of all land as compared with total land area, by regions, 1954	23
Major uses of nonfarmland as compared with total land area, by regions, 1954	24
Land capability as compared with total land area, by regions, 1950	25
Irrigated land in farms, acreage, 1954	27
Irrigated acreage of specified crops and pasture in the 20 States: 1954	27
Irrigated land—increase and decrease, in acreage, 1949–1954	27
Areas irrigated and irrigable	28
Acreage of irrigated land in the United States: 1889–1954	28
Farm drainage, acreage, 1947–53	29
Farm drainage in United States	29
Land cleared, acreage, 1954	30
Brush control, acreage, 1954	30
Seeding and reseeding of pasture, acreage, 1950–53	31
Seeding and reseeding of pasture, 3-year averages, United States	31
Land in cover crops turned under for green manure, acreage, 1954	32
Land in row crops or close-seeded crops grown in strips for wind erosion control, acreage, 1954	32
Cropland used for grain or row crops farmed on the contour, acreage, 1954	33
Number of farms, 1954	35
Commercial farms, number, 1954	35
Other farms, number, 1954	35
Percent of total land area in farms, 1954	36
All land in farms, acreage, 1954	36
Land in farms, by tenure of operator, for the United States: 1954	36
Acreage of land in farms and not in farms, for the United States: 1850–1954	36
Land in farms and number of farms for the United States: 1850–1954	37
Commercial farms as a percent of all farms, 1954	38
Average size of commercial farms, 1954	38
Average value of land and buildings per acre, 1954	39

	Page
Distribution of selected resources for the United States by regions and by commercial and other farms within regions: 1954	40
Percent of total population represented by farm population, April 1, 1950	41
United States farm population	41
Tractors on farms, number, 1954	42
Horses and mules, number, 1954	42
Tractors—increase and decrease, in number, 1950–1954	42
Horses and mules, and tractors on farms, January 1	42
Principal machines on farms, 1940 and 1955	43
Farm production per acre and per animal	44
Trends in population, cropland and farm output in United States	44
Acreage on which commercial fertilizer was used, 1954	45
Changes in use of fertilizer and farm income	45
Average value of farm products sold per acre of all land in farms, 1954	46
Value of all crops sold as a percent of all farm products sold, 1954	46
Value of all farm products sold, dollars, 1954	47
Specified crops harvested—acreage and value of production, for the United States: 1954	47
Acreages in food grains, feed grains, oil seed crops, and cotton, for the United States: 1879–1954	48
Changes in harvested acres of principal crops, 1949–54	48
All wheat threshed, acreage, 1954	49
Oats threshed, acreage, 1954	49
Barley threshed, acreage, 1954	49
Rice threshed, acreage, 1954	49
Corn for all purposes, acreage, 1954	50
Sorghums for all purposes except for sirup, acreage, 1954	50
Soybeans grown for all purposes, acreage, 1954	50
Flax threshed, acreage, 1954	50
Peanuts grown for all purposes, acreage, 1954	51
Cotton harvested, acreage, 1954	51
Tobacco harvested, acreage, 1954	51
Sugar beets harvested for sugar, acreage, 1954	51
Land in fruit orchards, groves, vineyards, and planted nut trees, acreage, 1954	52
Vegetables harvested for sale, acreage, 1954	52
Irish potatoes, acreage, 1954	52
Dry field and seed beans harvested for beans, acreage, 1954	52
Land from which hay was cut, acreage, 1954	53
Wild hay cut, acreage, 1954	53
Alfalfa cut for hay, acreage, 1954	53
Clover or timothy cut for hay, acreage, 1954	53
Feed for all livestock, percentage of all feed from all concentrates, 1949–50	54
Feed for all livestock, percentage of all feed from hay, 1949–50	54
Feed for all livestock, percentage of all feed from pasture and grazing, 1949–50	54
Cattle on farms January 1	54
United States pig crops	54
Stock sheep and lambs on farms January 1	54
Cattle, number, 1954	55
Milk cows, number, 1954	55
Hogs, number, 1954	55
Sheep, number, 1954	55
Output of poultry and eggs compared to other products	56
Increases in efficiency in poultry industry	56
Poultry meat supply (ready-to-cook basis)	56
Broiler chick placements, for 1954 and 1955 production, selected reporting areas	56
Chickens sold, number, 1954	56
Value of poultry and poultry products sold, dollars, 1954	56

INTRODUCTION

Since 1925, Censuses of Agriculture taken at 5-year intervals have provided information on the major uses of land in farms. The former Bureau of Agricultural Economics and the Production Economics Research Branch, Agricultural Research Service have compiled data at different times on the uses of land not in farms. Graphic presentation of the basic information about land use has accompanied the collection and tabulation of the basic statistics for each of the Censuses of Agriculture since 1925.

Numerous uses are made of the graphic presentation of available statistics and other information on the utilization of land. Facts relating to the present extent, location, and productivity of land used for different purposes are needed in the analysis of present and prospective agricultural or general economic conditions for the country as a whole and for specific areas. Future requirements for land resources need to be compared with present uses in order to determine the best possibilities for meeting the long-term demands for food and fiber required by an expanding population with a desire for an improved level of living. Alternative means of increasing production when the occasion arises will need to take account of possible shifts in land use that may be needed to provide more of some kinds of commodities and less of others as overall patterns of consumption change.

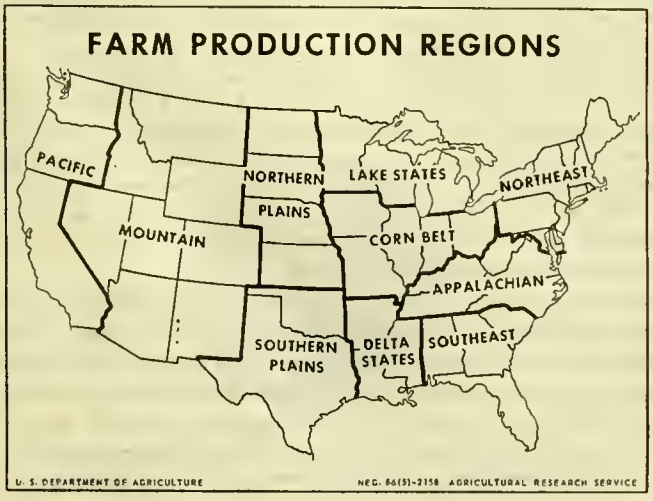
Current problems in the surplus production of some agricultural commodities are related in part to the need for certain basic shifts in land use. In order to approach an effective solution to this problem, a thorough understanding of how the land is presently used is a necessary starting point. Historical perspective is also required in order to arrive at satisfactory solutions to such problems of agriculture as the present overproduction of certain crops.

Competitive demands for the use of land have attracted considerable attention in recent years. Widely divergent opinions are expressed about the need to deal with such problems as the subdivision of good farmland for urban development, the need for recreational space near large concentrations of population, and the relationship between the improvement of farmland through drainage and the need to maintain adequate habitats for wildlife. If these and conflicts in use are to be resolved, a good basic knowledge of how the land is presently being used will be needed.

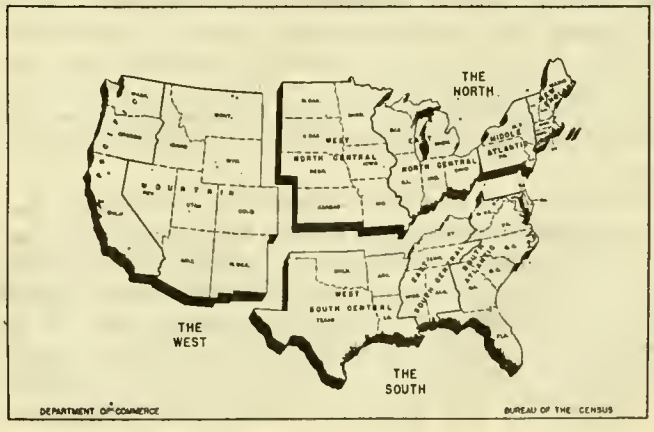
Sources of data.—The maps and charts pertaining to land in farms presented in this graphic summary are based principally on statistical data published in reports of the 1954 Census of Agriculture and in reports of earlier Censuses. Agricultural Research Service, Production Economics Research Branch, in the United States Department of Agriculture, has collected, integrated, and analyzed data on land not in farms and has related this information to Census statistics for land in farms. This information has been gathered from the records and reports of State and Federal agencies. These records of public land-owning and land-managing agencies, branches of State governments, and other sources were consulted in the preparation of an inventory of major land uses by the Production Economics Research Branch, Agricultural Research Service. Aerial photographs, topographic and other maps, soil surveys, and related materials provided information necessary for the preparation of some of the maps. The Soil Conservation Service supplied information on land clearing and brush control in soil conservation districts for which technical assistance was provided. The Agricultural Conservation Program Service provided county data necessary for preparing maps on farm drainage and the seeding and reseeding of pasture.

Scope, definitions, and explanations.—The graphic summary of land utilization focuses attention on the major uses of land. Attention is given to land not in farms as well as to land in farms. Maps and charts showing present distribution and past changes for the major land uses are included along with a brief explanatory text. This report is not concerned primarily with the distribution of crops and livestock and with changes in the production of individual commodities. However, a selected number of maps and charts dealing with some of the principal crops and with the main livestock classes are presented to facilitate the use and interpretation of maps and charts on major land uses. Care has been exercised in the selection of illustrations in order to include the most significant changes taking place as well as the present distribution of different land uses.

In the maps, charts, and text, terminology consistent with the various definitions contained in the 1950 Census of Agriculture is used. In describing and locating areas, commonly accepted geographical terms are used. In presenting data by States, farm-production regions or divisions are used in order to obtain more agriculturally related combinations of States than the geographic divisions used by the Census. This division permits the presentation of significant regional differences in land use which are obscured in Census data. Unless otherwise stated, the farm-production regions are used throughout this graphic summary. In order to avoid confusion, the comparative grouping of Census geographic divisions and farm-production regions is shown by the accompanying two maps.



MAP OF THE UNITED STATES, SHOWING GEOGRAPHIC REGIONS AND DIVISIONS



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MAJOR USES OF LAND

Inventory of land uses.—In a country as large as the United States, land is used for many diverse purposes. In the inventory and study of land, the several uses are commonly grouped into a few major categories designated as major uses. Cropland, pasture and grazing land, forest and woodland, and special-use areas and miscellaneous other land are discussed as major uses of land in this report. These major uses of land are explained here so that those who use the maps and charts in this report will understand more clearly some basic concepts about land use and how different uses are interrelated.

The major uses of land are often separated broadly into land in farms and land not in farms. Land in farms includes land used chiefly for agricultural purposes under direct, or sole control of the operators. Under this definition, land owned or leased and operated individually for farming by farm operators is considered as land in farms. It includes considerable areas of land not actually under cultivation and some land not used for pasture or grazing that is intermingled with farms or part of tracts used for farming. Large areas of timberland or other nonagricultural land held by farm operators as separate enterprises, and not used for pasture or any other farming purposes generally, are excluded from land in farms. Indian land, whether operated by Indians or leased out to others for agricultural purposes, is classified as farmland. Public land used under permit is not included in land in farms.

Nearly all of the cropland is a part of land in farms, although some cropland undoubtedly exists that has not been reported by the Census of Agriculture because of limitations of definition and underenumeration. Pasture refers to land in farms used for pasturing livestock, except for forage obtained from the aftermath of crops or by pasturing growing crops for short periods of time. Grazing pertains to land not in farms which is grazed. Forest and woodland may be either in farms or outside farm boundaries. Most of the special-use areas, except farmsteads, are not in farms. Miscellaneous unaccounted-for areas may be either a part of land in farms or land not in farms.

The major uses of land are also subdivided on the basis of actual vegetative cover on the land at the time of classification. Thus, cropland may be broken down into cropland used for crops, cropland used only for pasture, and cropland idle or used for growing soil-improvement crops. Cropland used for crops includes cropland harvested, cropland on which crops failed, and cropland used for cultivated summer fallow. Cropland used only for pasture may also be considered as a part of the pasture area. For the most part, cropland used only for pasture is pasture that is grown in rotation with crops, although some of it may be cropland that is no longer used for producing crops and that may eventually become idle cropland or permanent pastureland.

Pasture and grazing land has a great variety of vegetative cover and varies widely in the amount of forage furnished to livestock. Pasture in farms consists of open or nonforested pasture, including cropland used only for pasture, other open grassland pasture (not cropland and not woodland), and woodland pastured. Woodland or forest land that is pastured is also considered a part of the forest-land area. In some parts of the country, the woodland in farms that is pastured may be commercial forest land while in other areas it has little commercial value.

Grazing land may be either forested or nonforested. Nonforested range produces forage suitable for grazing without cultivation, including mountain meadow, cutover land, and brushland on which the number or grouping of any brush and trees is such that the land could not be considered forest land. In the Western States, much of the grazing land not in farms is public land that has never been privately owned. Seasonal use of the nonfarm grazing land furnishes an important complementary source of forage to that produced on farms and ranches. In parts of the South, privately owned nonfarm forest land is extensively grazed, particularly in spring and early summer.

Forest and woodland may be considered in several ways. Some forest types may be pastured or grazed; other types may have little value for forage. The farm and nonfarm breakdown of forest and woodland is significant from the standpoint of forest management. Private or public ownership is also an important separation in any inventory of forest and woodland use. The commercial and noncommercial value of forest and woodland is needed for studies of timber resources.

By definition of the United States Forest Service, forest and woodland includes: (1) Land 10 percent or more stocked with trees of any size and capable of producing commercial timber and other valuable wood products and services; (2) land from which trees have been removed to less than 10 percent stocking and which has not been developed for uses other than timber production; (3) afforested areas (planted); and (4) arid woodland with dense cover, such as chaparral. Adherence to this definition means that there may be some overlapping among the major uses of land as cropland and open grassland pastureland as reported by the Census of Agriculture may be included under certain circumstances as forest land under the definition used by the Forest Service in its inventory of forest land.

Special uses of land include a wide variety of uses, such as urban sites, highways, railroads, airports, parks, national defense areas, wildlife refuges, farmsteads, and farm roads and lanes. For the most part, these uses are largely nonagricultural. Much recent interest in this group of uses centers around the question of whether or not it is desirable to use good agricultural land for urban sites and other similar uses when less desirable agricultural land suitable for such uses is available. The competing demands for the use of land are particularly acute in good farming areas where urban and industrial expansion have been rapid.

Other miscellaneous unaccounted-for areas include deserts, sand dunes, bare rock areas, and marshes. Some of the land having these physical characteristics is used for military purposes or for parks and wildlife refuges.

Some land may have two or more uses. When land is used for multiple purposes, it is sometimes difficult to distinguish primary and secondary uses. The extent to which the exact area or closely intermingled areas have more than one use may also be hard to determine. In an inventory of land use, it is not always possible to eliminate completely duplications arising from the multiple uses of land. But despite these difficulties, the possibilities of obtaining closer integration of such uses of land as recreation, watershed uses, forage, timber, and wildlife must be carefully explored in order that these uses may be geographically and economically available to the growing number of people who desire to use them.

Contrasts in land quality.—In this report, most of the land-use information is presented in terms of area used for different purposes. Data are often not so readily available for certain qualitative aspects of land use. Considerable variation exists in the quality of land used for different purposes. For example, nearly a tenth of the present cropland area should be converted to grassland and woodland. Different limitations on use apply to the land that is suitable for cropland.

Nearly nine-tenths of the production from pasture and grazing land comes from the 647 million acres of pasture in farms. This means that only a tenth of the forage comes from the 353 million acres of grazing land not in farms. The 66 million acres of cropland used only for pasture, which accounts for only about 7 percent of all pasture and grazing land, supplies approximately a third of the total feed production from pasture and grazing land.

Forest land has a similar wide variation in productivity. Of the 648 million acres of forest land in continental United States reported in the recent Timber Resource Review of the United States Forest Service, only 484 million acres are classified as commercial forest land. Of the commercial forest land, only 179 million acres are in sawtimber stands and 42 million acres of the commercial forest land are presently nonstocked.

Factors affecting land use.—The question of how land resources are used and how much production comes from different major uses is determined largely by four groups of factors affecting land use: (1) Physical conditions—climate, soil, topography, and vegetative cover; (2) control or ownership of the land; (3) requirements for the different commodities produced on the land; and (4) the status of technology relevant to land use.

Land use changes.—The historical background of land use must also be studied as a significant part of each of the above factors. For the United States, recognition of two general periods of land-use development are especially significant in acquiring an understanding of the present land-use situation. Before World War I, while new settlement of the land was still taking place, changes in the major uses of land occurred rapidly. Forests were cleared and the land was converted to cropland and pasture. Native grasslands were plowed and used for crop production for the first time. Mistakes were made in the selection of land suitable for cultivation, but often these appeared to be of little importance while new lands were still available.

During the last four decades, total acreages of cropland and pasture and grazing land have not increased or decreased greatly, but significant changes have nonetheless been taking place. Shifts in cropland and pastureland among regions have occurred. Cropland is becoming more concentrated on land with fertile soils and level topography. Land that is rough or otherwise physically ill-suited for crop production is reverting to pasture and forest. Gradual improvement of land being used for cropland and pasture is taking place through irrigation, drainage, clearing, and flood control. In some areas, urban, industrial, and related nonagricultural uses are encroaching on land formerly farmed.

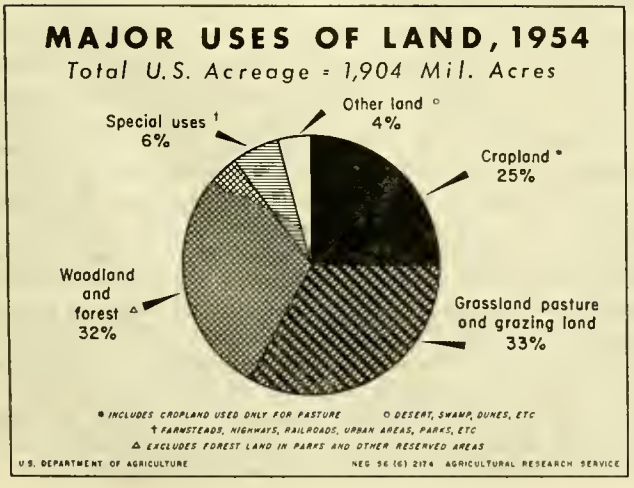
The present lack of balance between crops grown and the types of products in strongest demand indicates that future basic adjustments in land use are likely to occur. Careful study of the present patterns and past shifts of land use as these are affected by different factors or conditions will facilitate future changes that are needed in the major uses of land.

LAND USE—1954

Distribution of the 1,904 million acres of land in the continental United States among the major uses is shown in the accompanying chart. The total land in farms reported by the 1954 Census of Agriculture was 1,158 million acres, which is nearly identical with that reported for 1950. However, the distribution of the land in farms among the major uses has changed considerably. The 746 million acres of land not in farms also break down into the various major uses differently in 1954 from the estimates made for 1950 by the former Bureau of Agricultural Economics. Some of these shifts in acreage among the major uses represent actual changes while others are related in part to difficulties in classification and definition.

If the division between land in farms and land not in farms is omitted, the total land in each of the five major uses would be allocated as follows:

	Million acres
Cropland (including that used only for pasture)	460
Pasture and grazing land (including woodland and forest land pastured or grazed)	934
Forest and woodland not pastured or grazed	314
Special-use areas (cities, parks, highways, railroads, airports, wildlife refuges, defense areas, farmsteads, farm lanes, and related uses)	110
Miscellaneous other land (deserts, swamps, sand dunes, bare-rock areas, beaches, etc.)	86
Total	1,904



Cropland is made up of cropland harvested (333 million acres), cropland used only for pasture (66 million acres), and cropland not harvested and not pastured (61 million acres). Cropland not harvested and not pastured includes cultivated summer fallow, land on which all crops failed, land in soil-improvement crops only, and land seeded to crops for harvest after 1954. Cultivated summer fallow totaled 29 million acres in 1954. This was 3 million acres more than was reported by the 1950 Census of Agriculture. This increase may be attributed principally to acreage allotments on wheat and cotton that were in effect for 1954 but were not applicable for these crops in 1949. Land on which crops failed in 1954 totaled about 13 million acres according to estimates prepared by the Production Economics Research Branch, Agricultural Research Service, United States Department of Agriculture.

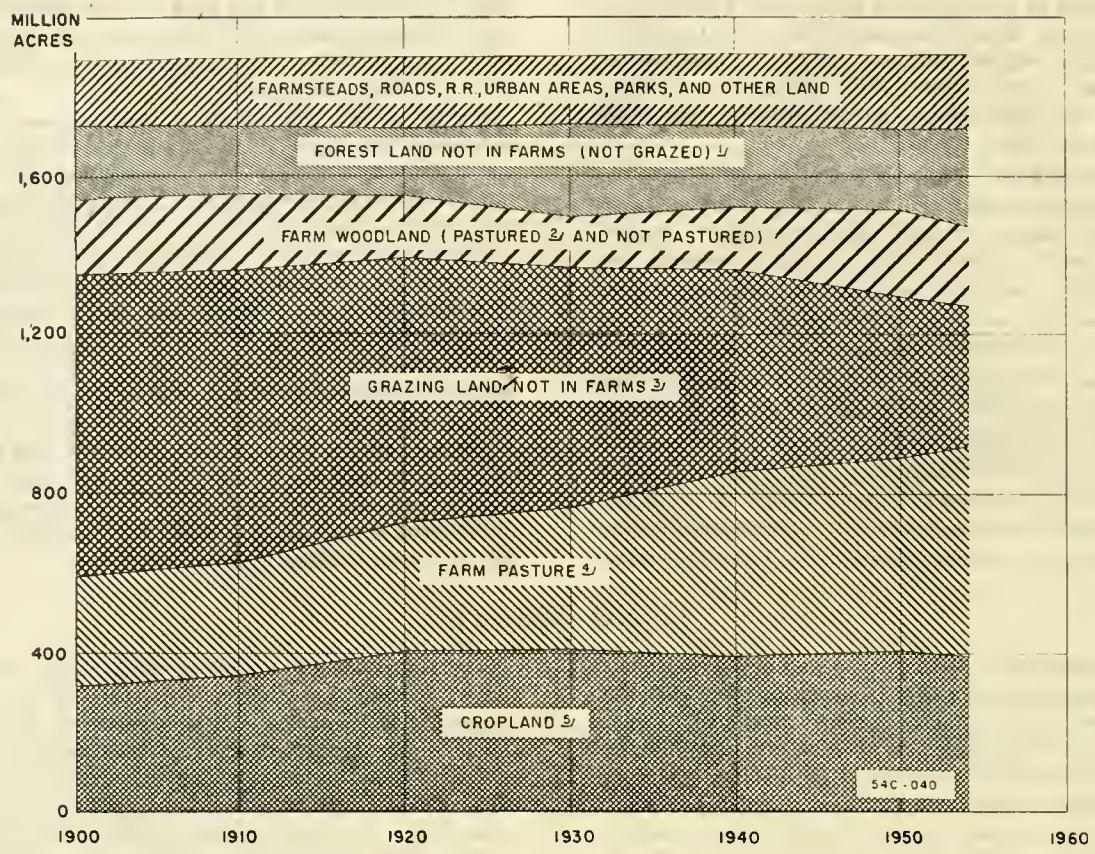
In order to obtain the total acreage of all pasture and grazing land, the 66 million acres of cropland used only for pasture can be added to the 934 million acres of other pasture and grazing land. This makes a total of 1 billion acres used for pasture and grazing. Pasture in farms totals 647 million acres and grazing land not in farms accounts for the remaining 353 million acres.

Woodland and forest land total 615 million acres. This total is obtained by adding the 301 million acres of woodland and forest pastured or grazed to the 314 million acres not used for that purpose. Woodland and forest land in farms totals 197 million acres, while that not in farms accounts for 418 million acres. The 615 million acres of woodland and forest land does not include 26 million acres of reserved forest land that is set apart in parks, wildlife refuges, and other special uses.

Special-use areas in the aggregate occupy only about 5 percent of the total land area, but the competition between such uses and agricultural uses is an important problem in many areas. Frequently, good agricultural land may be diverted to these uses when land of lower agricultural value is available. Whether or not this is in the best interests of the Nation is a question that needs to be answered.

The 86 million acres of land classified under miscellaneous other uses is for the most part land that is not used for other purposes. Of this 86 million acres of miscellaneous other land, it is estimated that 20 million acres is wasteland in farms. It does not include all deserts, swamps, sand dunes, beaches, and bare-rock areas. Frequently, such areas are a part of national defense areas, parks, wildlife areas, and other related uses.

THE TREND IN LAND UTILIZATION



CONTINENTAL UNITED STATES EXCLUSIVE OF ALASKA.

1 EXCLUDES FORESTED AREAS RESERVED FOR PARKS AND RELATED USES AND ARID WOODLAND, BRUSHLAND, AND FOREST LAND USED FOR GRAZING.

2 121 MILLION ACRES WERE REPORTED PASTURED IN 1954.

3 INCLUDES GRASSLAND, ARID WOODLAND, BRUSHLAND, AND FOREST LAND GRAZED

4 OPEN PASTURE IN FARMS, INCLUDING CROPLAND USED ONLY FOR PASTURE AND OTHER PLOWABLE PASTURE.

5 INCLUDES SOIL IMPROVEMENT CROPS, SUMMER FALLOW, AND LAND SEEDED TO CROPS FOR HARVEST THE SUCCEEDING YEAR. CROPLAND ACREAGES ARE FOR THE YEAR PRECEDING THE DATE OF THE CENSUS EXCEPT FOR 1954.

CHANGES IN LAND USE

The Trend in Land Utilization

[Continental United States exclusive of Alaska]

Uses of land	1900	1910	1920	1930	1940	1950	1954
	Million acres	*Million acres*	*Million acres*	*Million acres*	*Million acres*	*Million acres*	*Million acres*
Cropland [1]	319	347	402	413	399	409	394
Farm pasture [2]	276	284	328	379	461	485	526
Grazing land not in farms [3]	768	739	661	578	504	400	358
Farm woodland (pastured and not pastured)	191	191	168	150	157	220	197
Forest land not in farms (not grazed) [4]	175	162	160	208	203	201	238
Farmsteads, roads, railroads, urban areas, parks, and other land	174	180	184	175	181	189	196
Total	1,903	1,903	1,903	1,903	1,905	1,904	1,904

[1] Includes soil-improvement crops, summer fallow, and land seeded to crops for harvest the succeeding year. Cropland acreages are for the year preceding the date of the Census except for 1954.

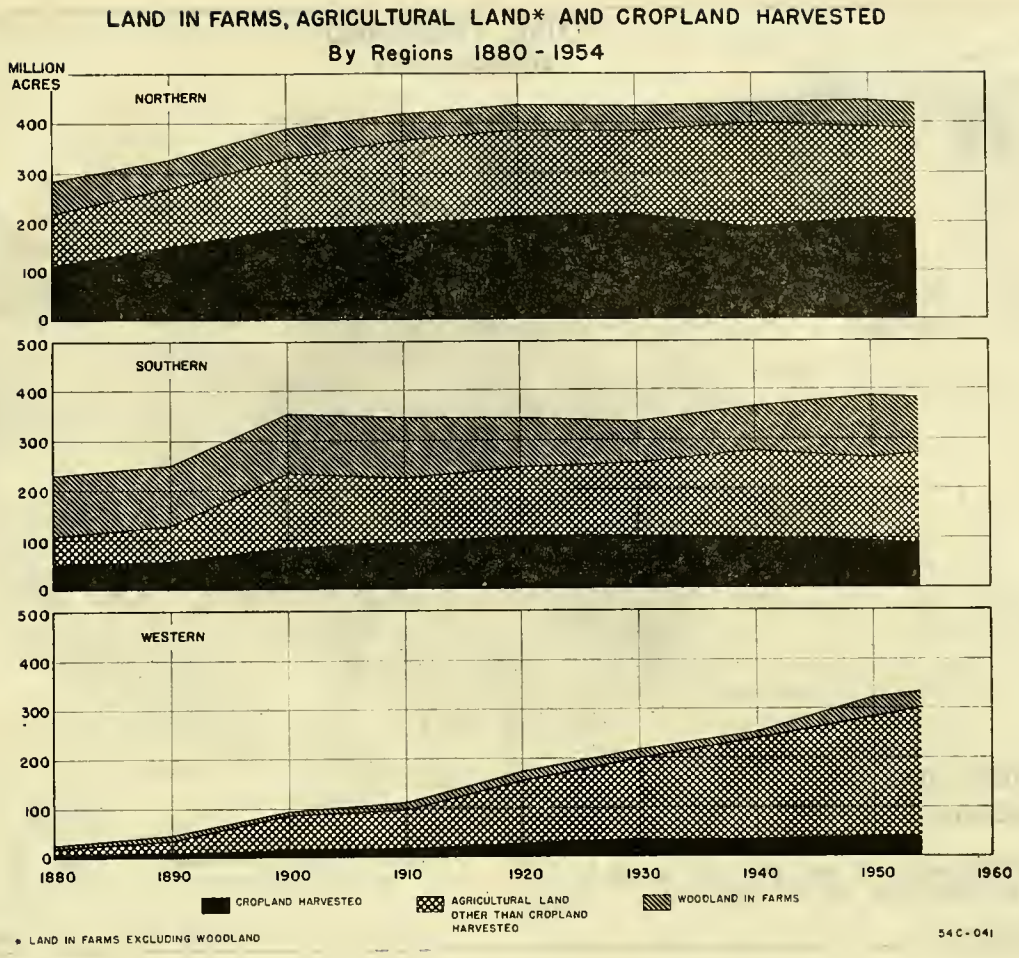
[2] Open pasture in farms, including cropland used only for pasture and other plowable pasture.

[3] Includes grassland, arid woodland, brushland, and forest land grazed.

[4] Excludes forested areas reserved for parks and related uses and arid woodland, brushland, and forest land used for grazing.

Historical changes in the major uses of land in the United States can be grouped into two periods. The first period lasted until about 1920. This was the settlement or pioneer period which came to a close with the expansion of the cropland area into the subhumid parts of the Great Plains during and following World War I. From 1880 to 1920, the acreage of cropland harvested was more than doubled as it increased from 178 to 362 million acres. This rapid expansion in the acreage of cropland was accompanied by large decreases in the area of native grassland. Grazing land not in farms, which includes idle grassland and arid woodland and brushland grazed, was reduced by about 380 million acres between 1880 and 1920. Part of this grazing land was converted to cropland and part of it has since been included as land in farms. Clearing of forest land also continued during this period as cropland and open pastureland were added to farms in the 31 Eastern States and in parts of the Pacific Northwest. The forest area was reduced by 50 to 75 million acres between 1880 and 1920.

A greater degree of stabilization in the major categories of land use has characterized the period since 1920. Fluctuation rather than a continued increase in acreage of cropland has prevailed. But significant regional shifts in distribution of cropland have occurred. Land development and improvement through drainage, irrigation, and clearing of forests has continued to expand the acreage of cropland in some areas bypassed or only partially developed during the settlement period. Reversion to woodland and conversion to such nonagricultural uses as cities, highways, airports, parks, defense areas, and related uses have offset some of the additions to cropland and improved pasture through the development of new land. More of the grazing land not in farms has become a part of the pasture area in farms. This is partly explained by the inclusion of more public land in farms. If the grazing land is leased, it is reported in farms; but if it is used under permit, it is not included as a part of the land in farms as defined for the Census of Agriculture.



REGIONAL TRENDS IN LAND USE

The general trends of land in farms, agricultural land (excludes woodland), and cropland harvested are shown for the Northern, Southern, and Western States in the accompanying chart. In all three groups of States, land in farms and agricultural land increased in nearly all decades until 1940. Cropland harvested reached a peak acreage in the Northern and Southern regions in 1930, while the peak acreage for the Western States was reported by the 1950 Census of Agriculture.

Several important contrasts in trends exist among farm-production regions within these three groups of States. These regional changes in land in farms, agricultural land, and cropland harvested are summarized briefly:

Northern States:

(1) **Northeastern States.**—Nearly uninterrupted decline since 1900 in land in farms, agricultural land, and cropland harvested characterizes this region. Abandonment of agricultural land in the face of competition from midwestern agricultural areas and urban and industrial expansion into agricultural areas have contributed greatly to this decline.

(2) **Lake States.**—Substantial increase occurred until 1920. Fluctuation in land in farms and agricultural land has prevailed since 1920. Cropland harvested more than doubled between 1880 and 1920. During the last 35 years, it has increased from 35 to 37 million acres.

(3) **Corn Belt.**—Land in farms reached a peak of 147 million acres in 1900 and since then it has fluctuated between 146 and 138 million acres. Agricultural land reached its first peak in 1910 and since has ranged between 119 and 127 million acres. Cropland harvested reached a peak of 80 million acres in 1920. After some decline in intervening years, cropland harvested totaled 77 million acres in 1954.

(4) **Northern Plains.**—Nearly uninterrupted increase of land in farms and agricultural land characterizes this region. Cropland harvested reached a high point of 85 million acres in 1930. Drought frequently reduced the acreage harvested during the 1930's, but since World War II crops have been harvested from nearly 80 million acres of cropland each year.

Southern States:

(5) **Appalachian.**—Land in farms has dropped from a high of 96 million acres in 1900 to 76 million acres in 1954. Agricultural land accounted for 50 to 55 million acres between 1900 and 1950. In 1954, it dropped to 46 million acres. Cropland harvested has fluctuated between a high of 25 million acres and a low of 19 million acres in 1954.

(6) **Southeastern States.**—Land in farms reached a peak in 1950 largely because large grazing areas in Florida have been included as land in farms in recent years. Cropland harvested has declined by 8 million acres from a peak of 24 million acres in 1920.

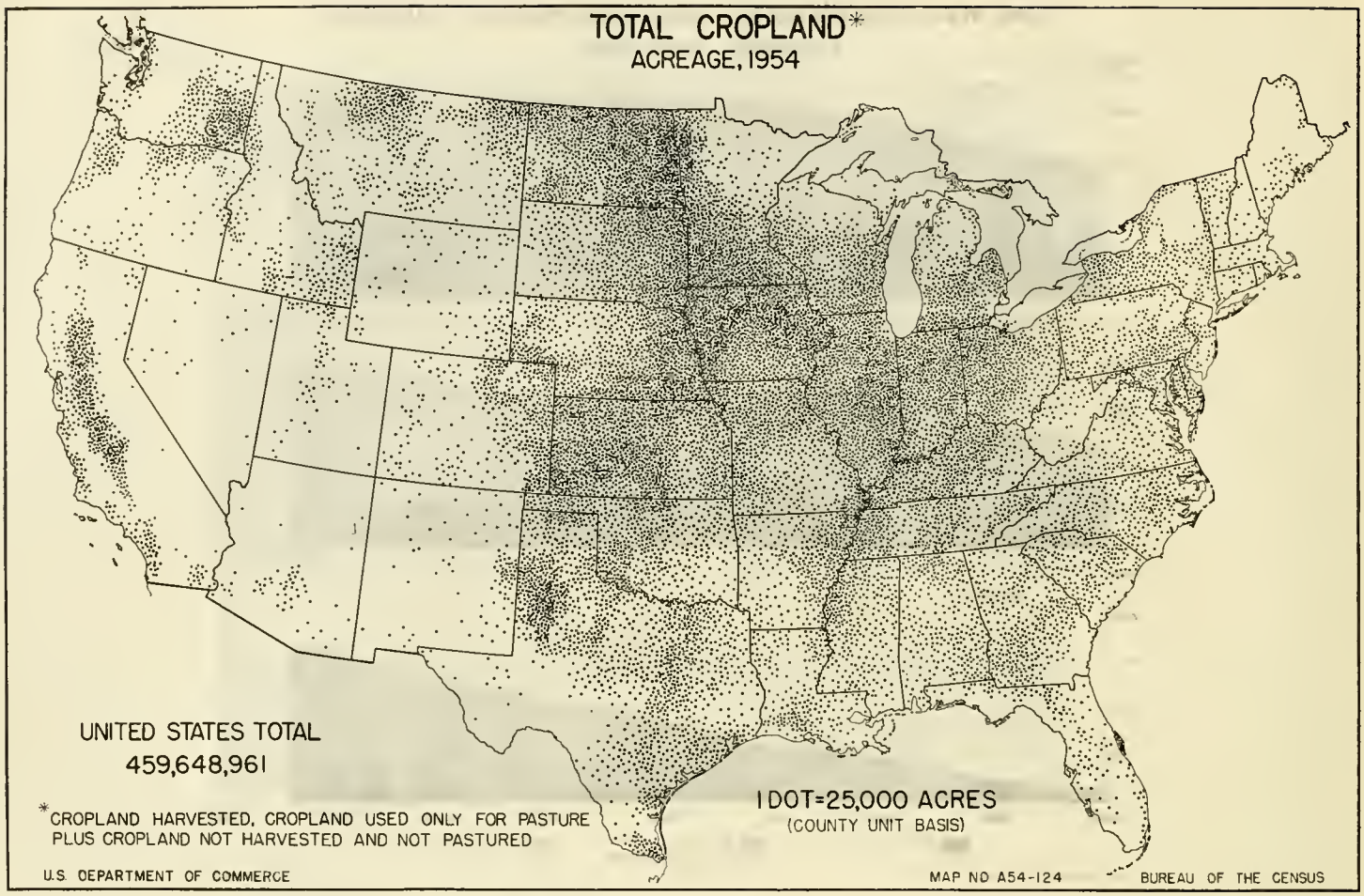
(7) **Mississippi Delta.**—The highest acreage of 51 million acres of land in farms was reported in 1950. Agricultural land increased from 15 million acres in 1880 to 32 million acres in 1940, 1945, and 1950, and then declined slightly in 1954. Cropland harvested has declined 3½ million acres from the 1940 peak.

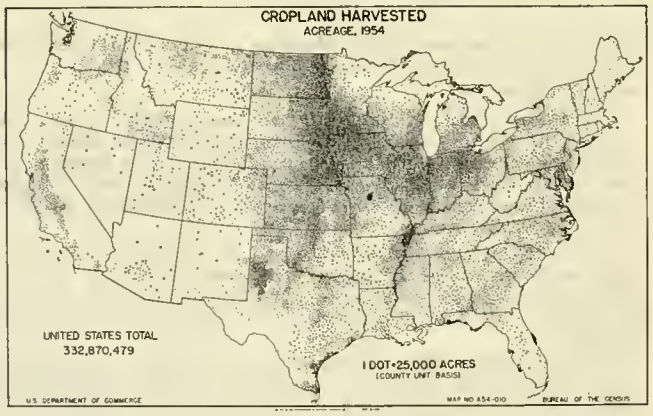
(8) **Southern Plains.**—A fivefold increase in land in farms during the last 75 years characterizes this region. Pronounced fluctuations in the acreage of agricultural land are explained in part by difficulties in applying definitions of open and woodland pasture in the areas of brush infestation in Texas. Cropland harvested has declined about 11 million acres from the peak of 46 million acres reached in 1930.

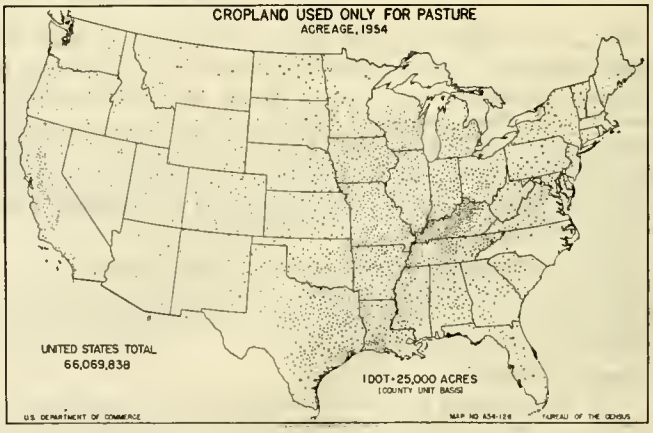
Western States:

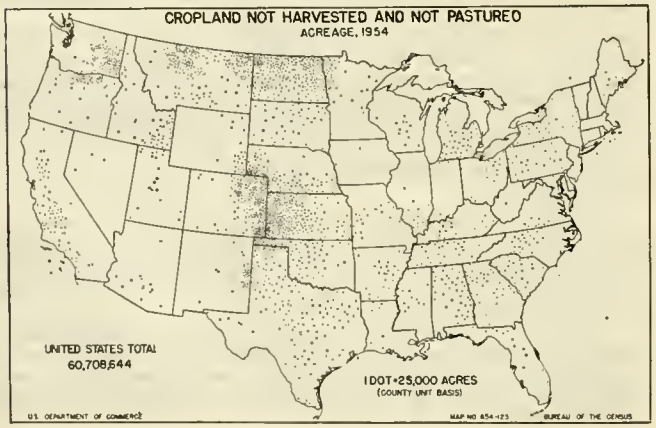
(9) **Mountain States.**—Land in farms, agricultural land, and cropland harvested have all increased during the 75-year period. The inclusion of more of the grazing area in farms, gains in the acreage irrigated, and development of dry-farming practices are responsible for these increases.

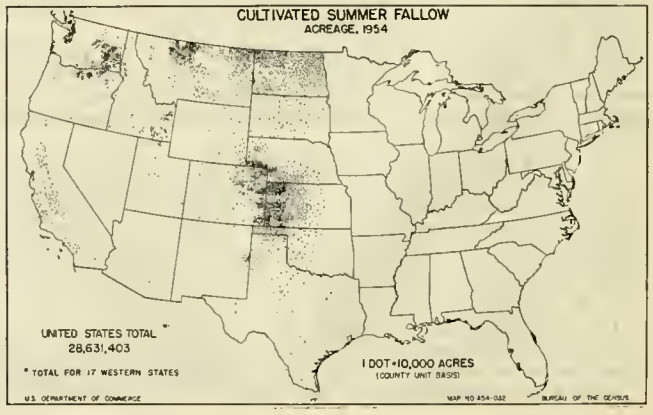
(10) **Pacific States.**—The trend in the three Pacific States has been very similar to that in the Mountain States. Land in farms, agricultural land, and cropland harvested have all more than tripled during the 75-year period covered by the accompanying chart.

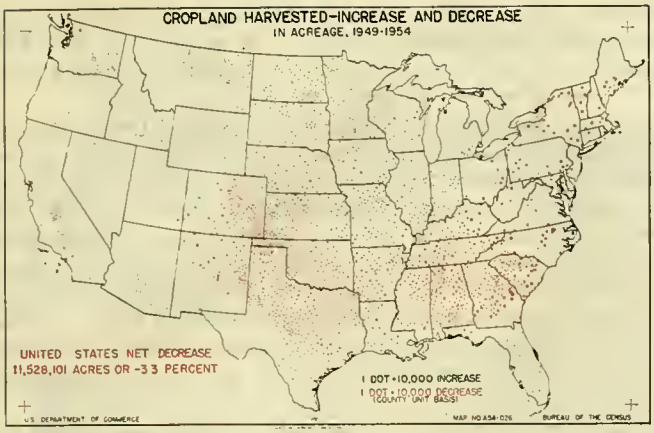

TOTAL CROPLAND*
ACREAGE, 1954
UNITED STATES TOTAL
459,648,961
*CROPLAND HARVESTED, CROPLAND USED ONLY FOR PASTURE PLUS CROPLAND NOT HARVESTED AND NOT PASTURED
1 DOT=25,000 ACRES
(COUNTY UNIT BASIS)
U.S. DEPARTMENT OF COMMERCE
MAP NO A54-124
BUREAU OF THE CENSUS

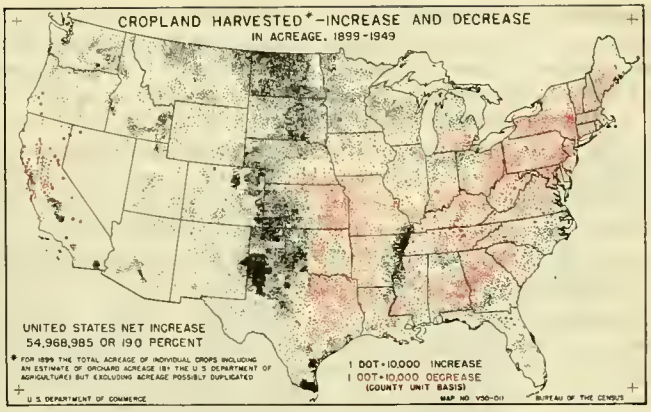

CROPLAND HARVESTED
ACREAGE, 1954
UNITED STATES TOTAL
332,870,479
1 DOT=25,000 ACRES
(COUNTY UNIT BASIS)
U.S. DEPARTMENT OF COMMERCE
MAP NO A54-010
BUREAU OF THE CENSUS


CROPLAND USED ONLY FOR PASTURE
ACREAGE, 1954
UNITED STATES TOTAL
66,069,838
1 DOT=25,000 ACRES
(COUNTY UNIT BASIS)
U.S. DEPARTMENT OF COMMERCE
MAP NO A54-126
BUREAU OF THE CENSUS


CROPLAND NOT HARVESTED AND NOT PASTURED
ACREAGE, 1954
UNITED STATES TOTAL
60,708,644
1 DOT=25,000 ACRES
(COUNTY UNIT BASIS)
U.S. DEPARTMENT OF COMMERCE
MAP NO A54-123
BUREAU OF THE CENSUS


CULTIVATED SUMMER FALLOW
ACREAGE, 1954
UNITED STATES TOTAL *
28,631,403
* TOTAL FOR 17 WESTERN STATES
1 DOT=10,000 ACRES
(COUNTY UNIT BASIS)
U.S. DEPARTMENT OF COMMERCE
MAP NO A54-032
BUREAU OF THE CENSUS





CROPLAND

Almost three-fourths of the agricultural production of our country is derived from that part of the land resources that are used to produce crops. The total area of cropland contained 460 million acres in 1954, which accounts for a fourth of the total land area. Cropland used only for pasture is included in this total cropland area.

The decrease in total acreage of cropland between 1949 and 1954 amounted to 18 million acres. Several different factors account for this change. The decrease in cropland harvested between 1949 and 1954 represents in part an actual decrease in land used for that purpose. Acreage allotments on wheat, cotton, and corn which were in effect in 1954 but not in 1949 encouraged a diversion of part of the acreage used in preceding years to grow these crops to production of nonallotment crops. But part of the acreage was diverted to pasture and part of it remained idle.

The decrease in cropland used only for pasture and in idle cropland may be due partly to the fact that cropland used only for pasture in 1949 which was not actually in rotation with crops was less frequently reported as cropland in 1954. This shift is particularly evident in parts of the South where the seeding of pastures on cropland taken out of crop production proceeded rapidly after World War II. Much of this cropland, which had been seeded for only a short time when the 1950 Censns of Agriculture was taken, has remained in pasture and hy 1954 it was generally considered as permanent grassland pasture.

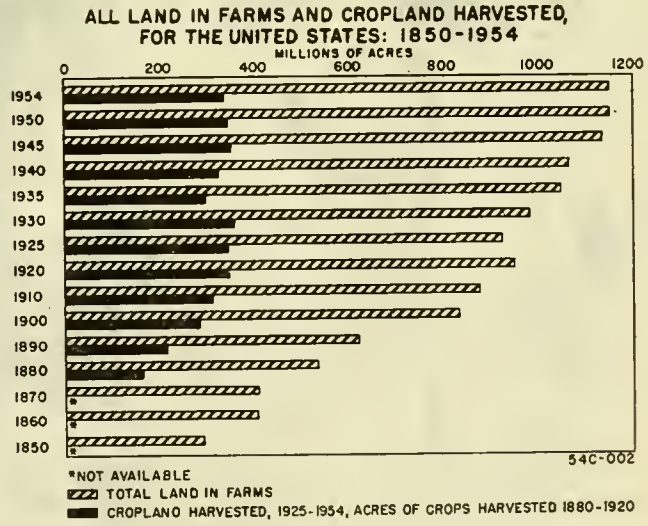
Looking at a longer period of time, cropland used for crops or idle as reported at 5-year intervals by the 8 Censuses of Agriculture from 1920 to 1954 has averaged 403 million acres. The 1954 acreage of cropland used for crops or idle was 2 percent below this average while the 1950 acreage was about 1 percent above the average. This stability in acreage of cropland has been an important characteristic of agricultural land use since the end of World War I.

Although the overall changes in cropland area have been comparatively small, a considerable amount of change in distribution and kind of land used for crops has taken place. The distribution of total cropland and its component parts are shown by the accompanying maps along with a chart and map showing changes in cropland harvested, which is the most important part of the cropland area.

Total cropland.—The heavy concentration of cropland in the Corn Belt and in the eastern part of the Great Plains is a striking characteristic of any map showing the distribution of cropland in the United States. The 11 Corn Belt and Great Plains States have 245 million acres of cropland or more than half of the total acreage of cropland. Yet the land area of these 11 States accounts for only a fourth of the total land area of the country.

Other concentrations of cropland are less extensive but they are significant and are observable on the accompanying map. The ribbon of concentration along the lower Mississippi River and the extension of the high density cropland area of the Corn Belt into the Lake States are two other areas in the Eastern States. In the 11 Western States, cropland area is closely associated with situations in which irrigation and dry-farming are practiced. Except for parts of the Pacific Northwest, crops are not widely grown in the Western States without reliance upon either irrigation or conservation of moisture by fallowing.

Cropland harvested.—The distribution of cropland harvested is very similar to that of total cropland. Parts of the country which have very little cropland include extensive areas in the West that are too dry and areas in the East that are too rough, too wet, or have soils too poor for profitable use. Prominent among these areas are the Southern Appalachian, Adirondack, and Ozark Mountain areas, the Maine woods, the northern part of the Lake States, and the flatwoods of the Southeast.



Cropland used only for pasture.—Included in the total cropland area are 66 million acres of pasture that is for the most part in rotation with crops. Some cropland may be occupied by pasture during the transition period between its use for crops and a state of idleness, which will probably be followed by reversion to permanent pasture or to woodland. From the map it may be observed that the highest density of cropland used only for pasture is in Kentucky. There it is associated with limestone soils and moderately sloping land.

Cropland not harvested and not pastured.—This category of cropland, which totaled 61 million acres in 1954, includes cultivated summer fallow, cropland on which crops failed, cropland used for soil-improvement crops, and idle cropland. As most of the cultivated summer fallow and much of the crop failure is reported in the 17 Western States, the major concentrations of cropland not harvested and not pastured are nearly all in these States. Cropland used for soil-improvement crops and idle cropland account for most of the cropland not harvested and not pastured in the 31 Eastern States. In 1954, less than a third of the crop failure occurred in the 31 Eastern States.

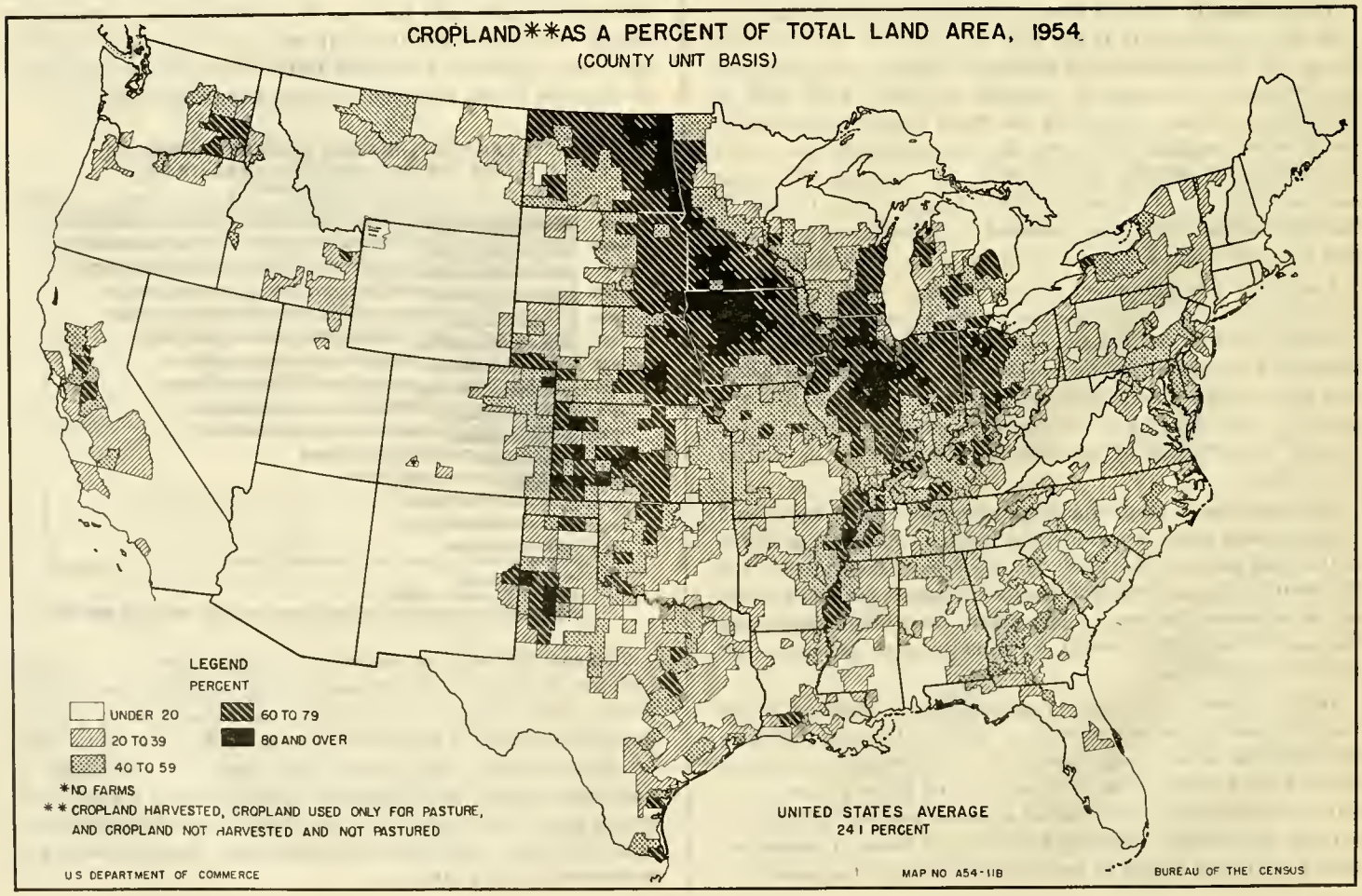
Cultivated summer fallow.—The practice of summer fallowing land is closely associated with growing wheat in the drier parts of the major wheat belts. By letting the land lie fallow for a crop season and by cultivating it to keep it free of weeds, the accumulation of soil moisture is sufficient to result in higher yields per acre. Cultivated summer fallow is widely used in the drier parts of both the spring and winter wheat belts.

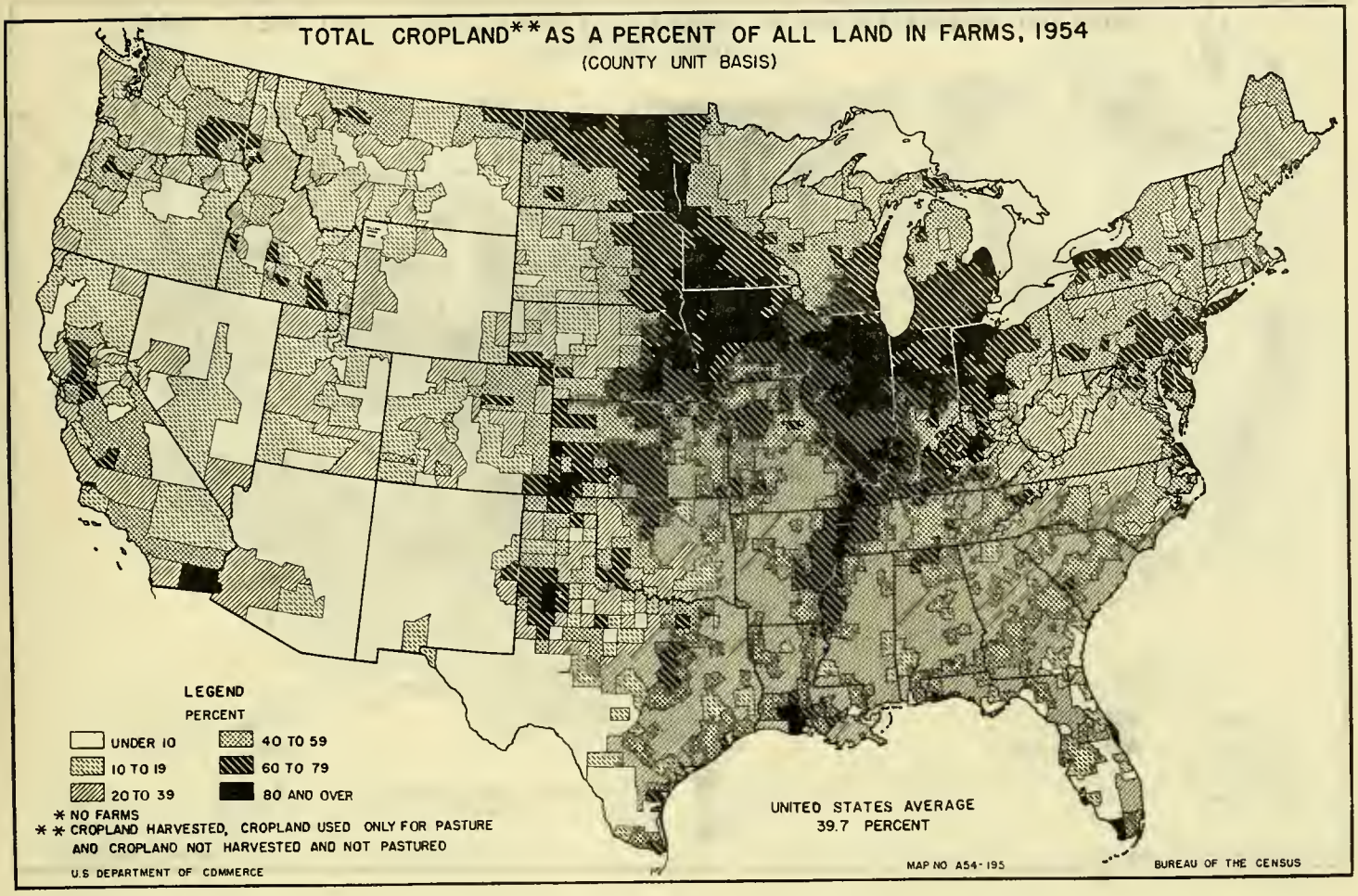
Cropland harvested—increase and decrease, 1949–54.—Changes in the acreage of cropland harvested were widespread between 1949 and 1954. Counties in which a decrease in acreage occurred are most heavily concentrated in the Southern States. Most of the change that took place in the Northeastern States was a decline in acreage. Counties in which increases occurred were located principally in the spring wheat-producing area of North Dakota, South Dakota, and Montana; in the central valley of California; the Columbia Basin; the rice-producing area of northeastern Arkansas; and the Corn Belt.

All land in farms and cropland harvested, 1850–1954.—The long-run trend in cropland harvested is compared with that for land in farms in the accompanying chart. Fluctuation rather than progressive change has characterized the acreage of cropland harvested since about 1920. Before that time the acreage steadily increased during the period of settlement. The high proportion of land in farms that is not used for growing crops is also emphasized by this chart.

Cropland harvested—increase and decrease, 1899–1949.—Decreases in cropland harvested that occurred over a 50-year period between 1899 and 1949 are found mainly east of the Great Plains. The decline is associated chiefly with hilly areas in which soil erosion and depletion have taken place. The most extensive areas of decrease are located in the Northeastern States, southern Piedmont, hill-land fringe of the Ohio Valley, eastern Texas, and the Ozark-Ouachita Highlands and adjacent hilly areas. Several small areas of sharp decline are largely associated with the growth of cities, as in northeastern Illinois and parts of southern Michigan.

The most widespread and heaviest increase occurred in the Great Plains. In the South, acreage in cropland harvested has expanded mainly in the Mississippi Delta, Coastal Plain, and in the Lower Rio Grande Valley. The Mississippi Delta, with its improved flood protection and drainage, greatly expanded acreage in cotton and other crops. In the Coastal Plain, use of fertilizers; drainage of land; suitability of soils for producing bright tobacco in North Carolina, South Carolina, and Georgia; expansion of peanut acreage in Alabama and Georgia; increased production of citrus fruits and vegetables; and additional acreages devoted to rice in Louisiana and Texas, have contributed to the increase in cropland. In the Lower Rio Grande Valley the acreage of cropland has been greatly expanded through irrigation. In the Corn Belt and Lake States, cropland has been added largely through drainage of wet lands on existing farms. In the 11 Western States, the increase in acreage of cropland harvested is associated chiefly with the development of irrigation and dry-farming.





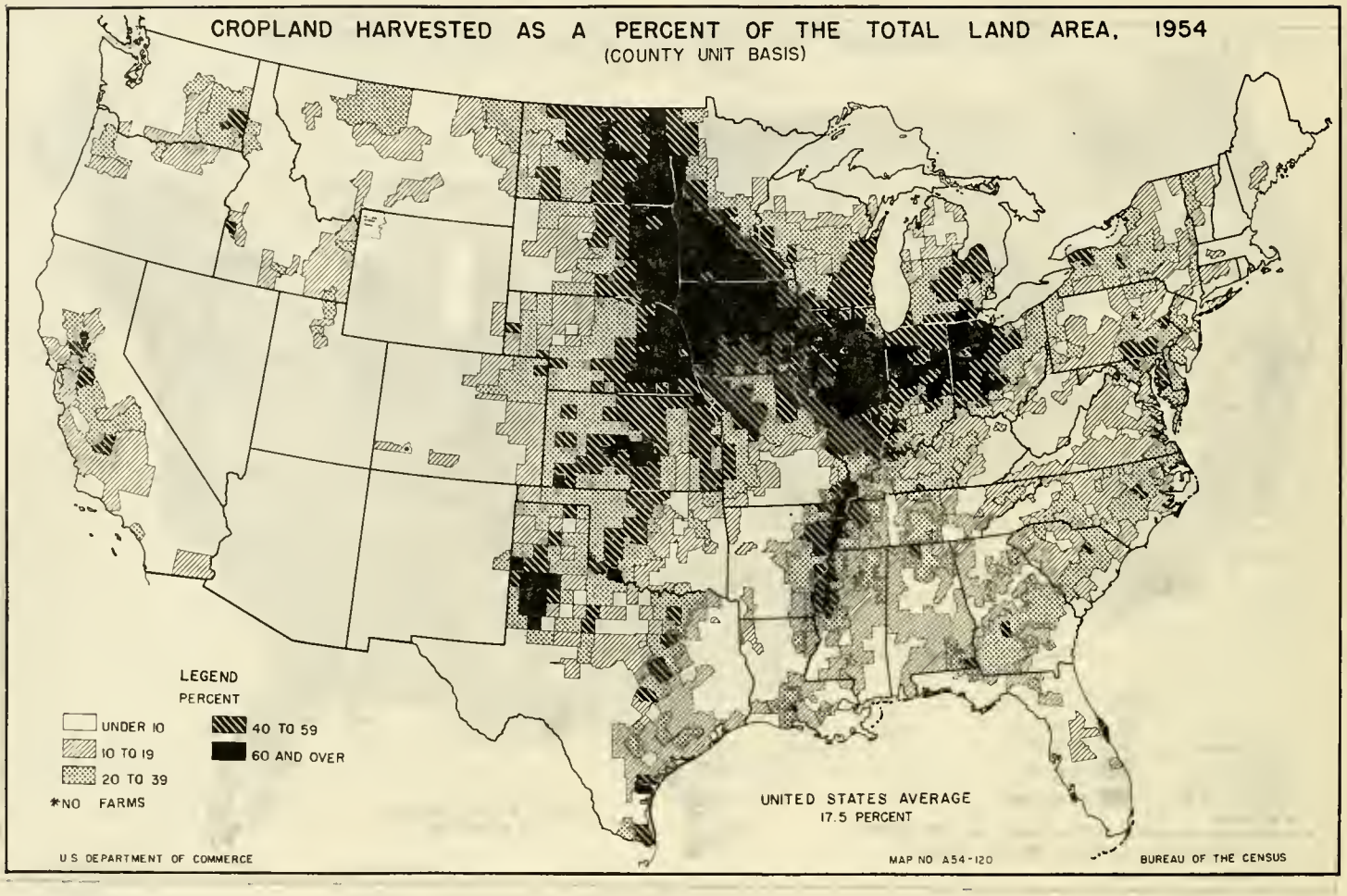
Cropland as a percentage of total land area.—This map shows the proportion of the total land area occupied by cropland. Two extremes stand out. On the one hand, there is the comparatively compact area in the North Central States in which nearly all of the counties have 60 percent or more of their total area in cropland. Counties with less than 20 percent of the total land area are at the other extreme. These counties are more widely scattered than are counties having high proportions of cropland. Very few counties in the Western States have more than a fifth of their total area in cropland. This is partly because of their large size and partly because of the widespread climatic limitations to crop production. In the East, counties with a low proportion of the total area in cropland are found in most States. The largest areas are associated mainly with rough topography, poor soils, and inadequate natural drainage. In some areas of contiguous counties, such as those in southern New England and in many scattered counties, urbanization has proceeded so far that cropland has become a minor use of land.

Since a county-unit basis is used on this map, several important details are obscured. For example, the high proportion of cropland in irrigated areas in the Western States is not clearly indicated. Small areas of rough forested land and poorly drained areas in the Eastern States cannot always be distinctly associated with the physical conditions that limit their use for crop production.

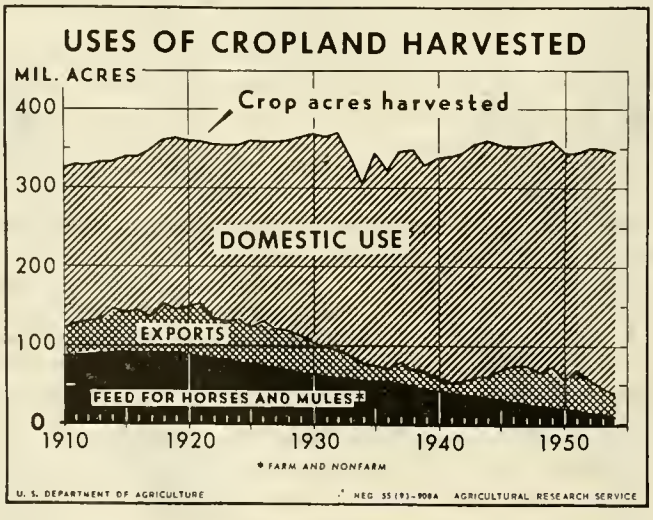
Some of the distinctive physical features that are related to the low proportion of cropland shown by this map are the Sand Hills of North Carolina, South Carolina, and Georgia; the Sand Hills of Nebraska; the ridge and valley section of the Appalachian Mountains; the Adirondack Mountains; the Cross Timbers of Texas; the Knobstone Belt in southern Indiana; unglaciated southeastern Ohio; and many other areas with relatively little cropland. Many of the unshaded areas in the East are used only to a limited extent for farming. In the West, grazing is the predominant use of the land over extensive areas.

Small areas with a high proportion of land used as cropland that do not stand out distinctly on a county-unit basis are the many small irrigated areas in the West, the Black Prairies of Texas, the Inner Bluegrass and the Pennyroyal areas of Kentucky, the southern shore of Lake Ontario, and the southern and eastern shores of Lake Okeechobee in Florida.

Total cropland as a percentage of all land in farms.—Essentially the same overall pattern is found represented in this map as that for cropland as a percentage of total land area. The map indicates the importance of cropland relative to other uses of farmland. In the West, ranches with large acreages used for pasture tend to obscure the much higher proportions of cropland on most irrigated farms. In the South, Northeast, and Lake States, much land in farms remains in forest. In some type-of-farming situations, the high proportion of forest land is associated with production of crops with high labor requirements, such as tobacco or cotton which are often concentrated on a few acres of the best farmland. In such instances, little attention is given to the rest of the farm.

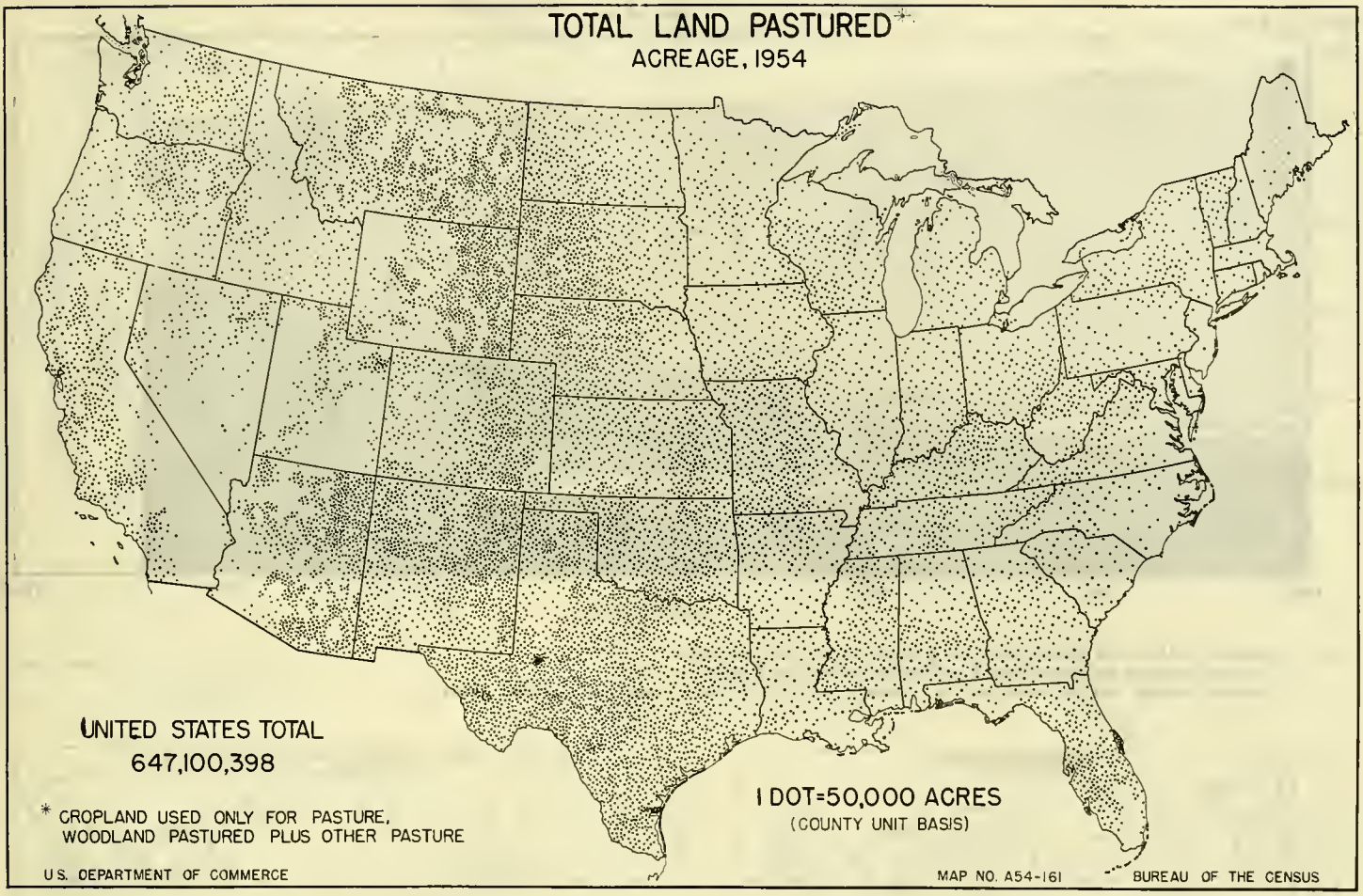


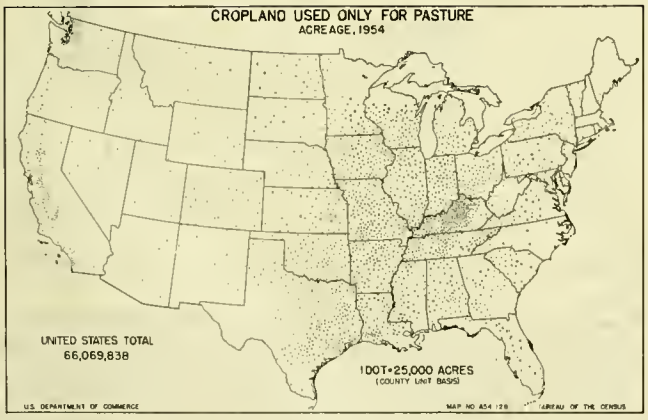
Cropland harvested as a percentage of the total land area.—Most of the counties with more than 60 percent of the total land area used for harvested cropland are concentrated in the North Central States. Only a few additional counties in Texas and in the Mississippi Delta fall into this category. Immediately surrounding this core of high-density counties are found most of the counties with 40 to 59 percent of the land area in cropland harvested. Counties with less than 10 percent of the total land area used for cropland harvested are numerous in the Western States, the mountainous and hilly areas of the Eastern States, the Coastal Plain flatwoods, and in the heavily forested counties of northern New England, and the northern parts of the Lake States.

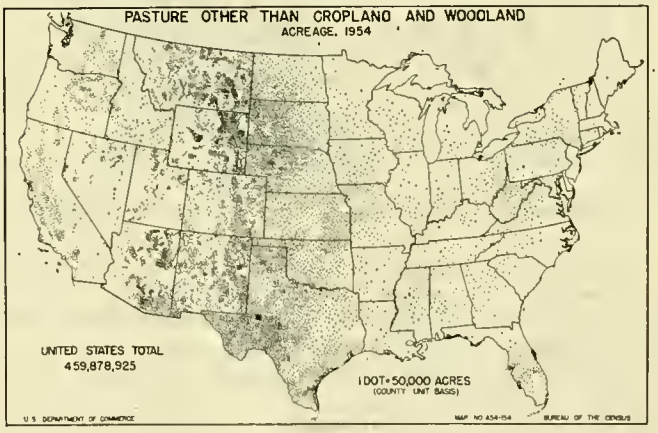


Uses of cropland harvested.—Most of the Nation's cropland is now used to produce products for domestic use. From 1950 to 1954, about 85 percent of the acreage of crops harvested was used in domestic consumption. The other 15 percent was used to produce exports and feed for horses and mules. Acreage used for producing exports during this 5-year period averaged 40 million acres and that used for feed for all horses and mules averaged 15 million acres. This represents a significant drop from the 1945–49 period when an average of 46 million acres were used for export production and 27 million acres were needed to feed all horses and mules.

From 1910 to 1914 only 60 percent of the acreage was used to produce domestic products. About 44 million acres were used to produce exports in the 1910-14 period. This means that the principal change in the disposition of production from the acreage of crops harvested has been the marked reduction in the acreage used to produce feed for horses and mules. The acreage used to feed horses and mules has declined by about 76 million acres between the 1910-14 and 1950-54 periods.





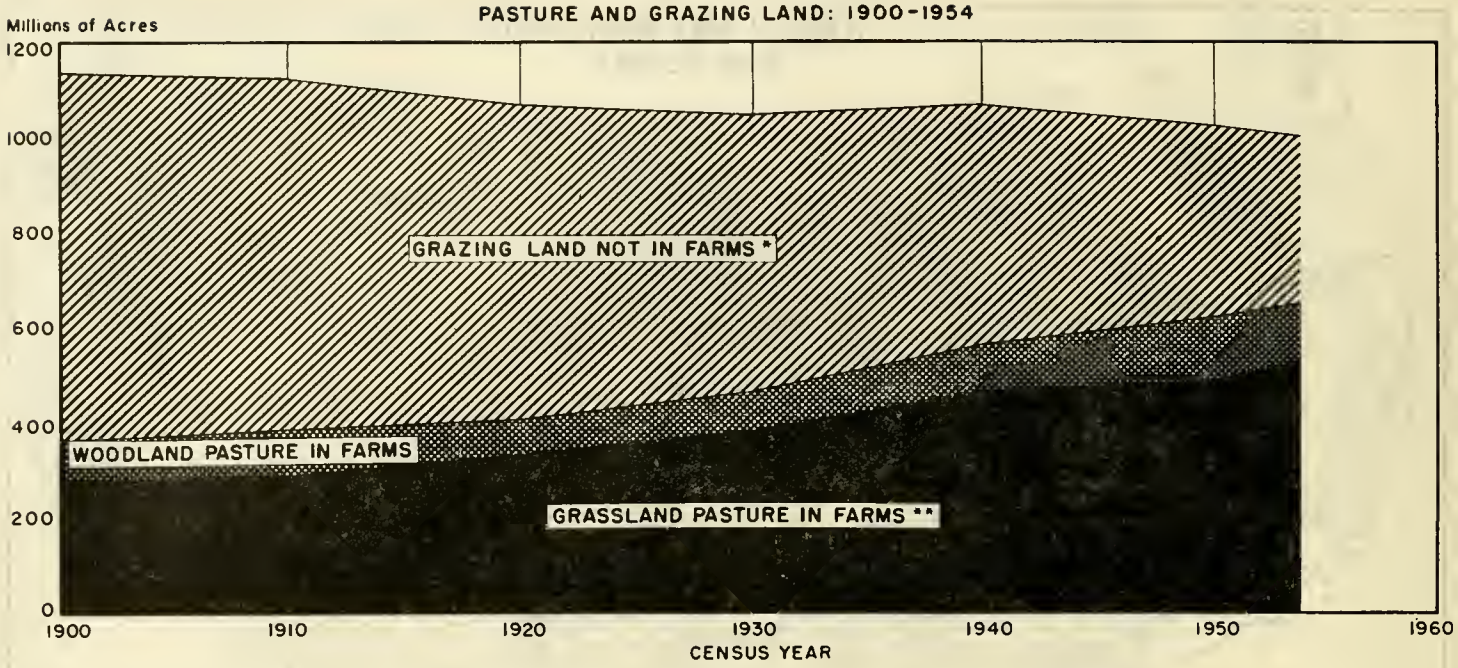


PASTURELAND

Total land pastured.—Nearly every part of the United States has some pastureland. The total acreage of all pasture in farms reported by the 1954 Census of Agriculture was 647 million acres. If the 353 million acres of grazing land not in farms is added to the acreage of pastureland in farms, the total acreage of all pasture and grazing land is about 1 billion acres. If the distribution of the grazing land not in farms were added to the map of total land pastured in farms, many of the areas not occupied by dots would be filled in. This would be particularly true in the Western and Southern States where most of the grazing land not in farms is located.

Cropland used only for pasture.—On the whole, cropland used only for pasture constitutes the most productive part of the pastureland area. Generally, it is pasture that is being grown in rotation with crops. As the accompanying map shows, this kind of pasture is especially concentrated in the Corn Belt, Delta, Southern Plains, and the western part of the Appalachian States. The major concentration in the Western States is located in the Central Valley of California.

Pasture other than cropland and woodland.—The pastureland included in this category differs widely in quality. Some of it has been improved by liming, fertilizing, and seeding. Extensive areas of the unimproved part of this open permanent pasture are parts of the native rangelands which are now included in the farmland acreage in the Western States. In the Eastern States, a considerable acreage of fairly open land that is gradually reverting to woodland is probably included. This kind of pastureland will eventually become woodland pasture.



NOTE: * Includes nonforested grazing land, idle grassland in first decades, forest and arid woodland grazed, and shrub and brush grazing land in all years.
** Includes cropland used only for pasture in recent years and plowable pasture in earlier years.

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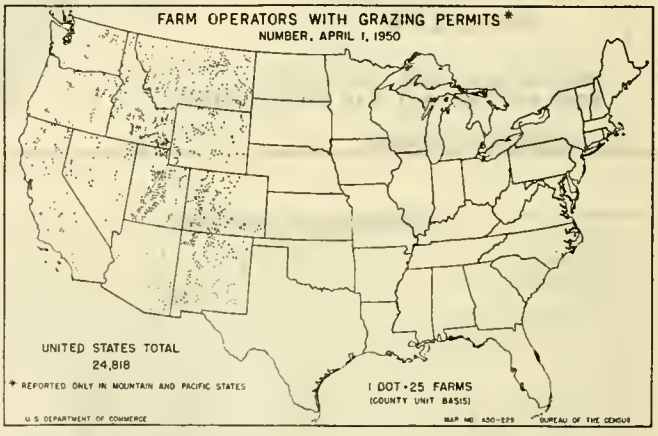
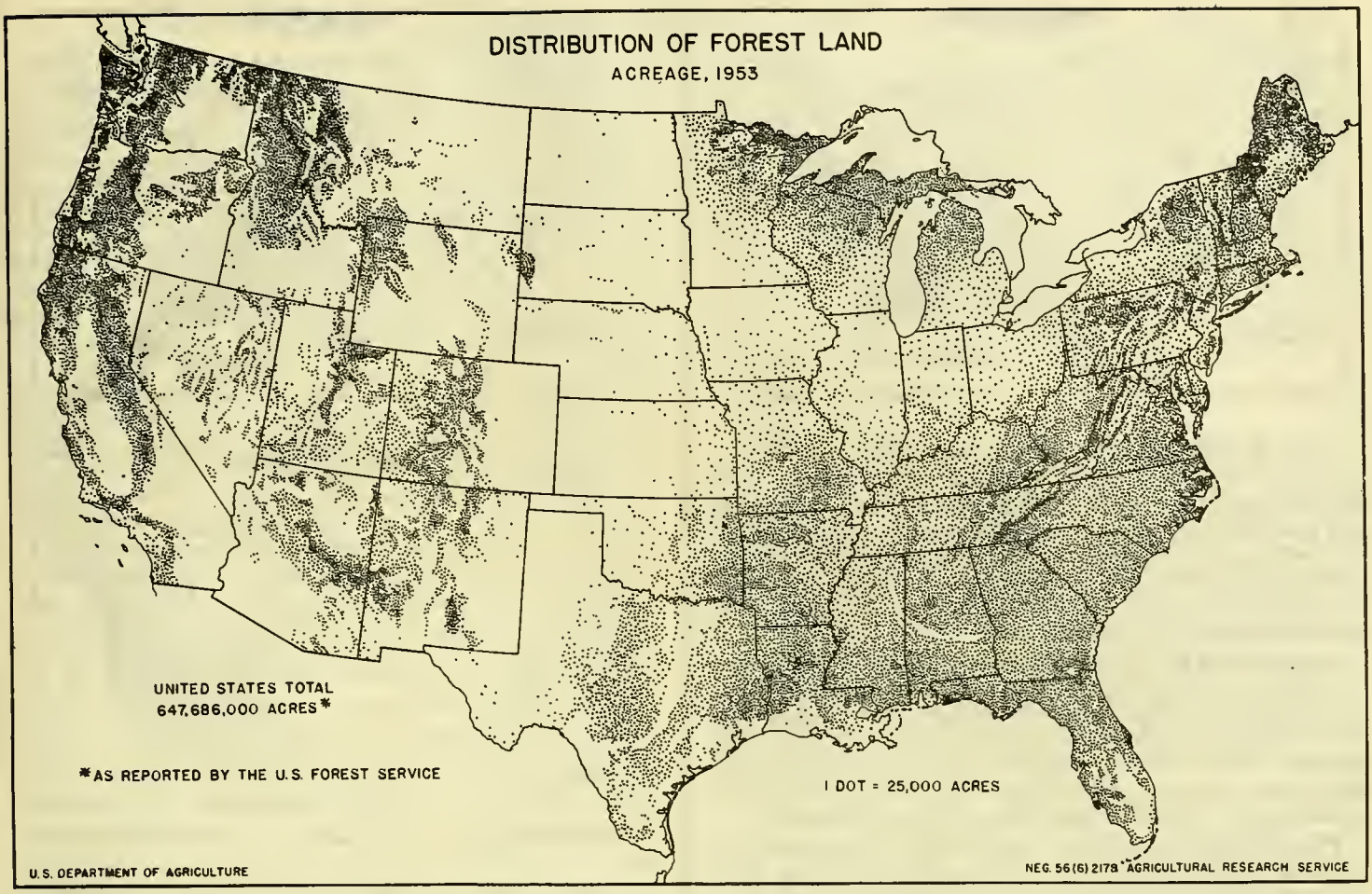


Pasture and grazing land, 1900–54.—The long-term trend in total pasture and grazing land has been slightly downward. More of the rangeland in the Western and Southern States has been included as land in farms. This partly accounts for the decrease in grazing land not in farms and the increase in farm pasture. Part of the decline in grazing land is explained by the plowing up of native grassland areas for cropland, particularly in the Great Plains. Woodland pastured in farms has changed comparatively little.

Several important changes in pasture and grazing land occurred between 1949 and 1954. Open grassland pasture in farms which was not cropland and not woodland increased by 44 million acres between 1949 and 1954. This gain is explained by several factors: (1) An actual gain in this type of pasture occurred with additions coming from seeding of idle and other cropland to pasture and the clearing of woodland, particularly in parts of the South. (2) The substantial gain in pasture in farms in the West was accompanied by a reduction of grazing land not in farms. (3) Pastureland in Texas and other parts of the Southwest which was reported as woodland pastured in 1949 was reported as nonwoodland pasture in 1954. This difficulty in enumeration is indicated by a comparison of acreages reported in these uses from 1945 to 1954. (4) Cropland which was reported as used for pasture in 1949 appears to have been reported more frequently as permanent grassland pasture in 1954.

Woodland pastured.—The value of woodland areas for pasture depends a great deal on the size and density of the trees, which in turn vary with the age and type of forest. In the Northern States, cutover hardwood forests, abandoned fields reverting to forests, and brush grown areas are often pastured. In the Southern States, some of the forests have a low tree density which permits a good undergrowth of plants of value for grazing. This is particularly true of the open longleaf-slash pine belt of the Coastal Plain, the Ozarks, and semi-prairie areas in Florida and along the Gulf Coast. In the 17 Western States, the woodland pastured includes arid woodlands, brush and shrublands, mixed woodland and grassland areas, open forests, and some cutover areas which have grass and other forage growth.

Farm operators with grazing permits.—In the Western States, a large acreage of Federal- and State-owned land is used by farmers under permits granted by the administering agencies. The land used by permit is complementary to owned or leased land. Much of it is grazed during only a part of the year. The United States Forest Service grants permits for grazing parts of the forest land which it administers. The distribution of farm operators with grazing permits is shown by the accompanying map.



WOODLAND AND FOREST LAND

The forest area of continental United States currently totals 648 million acres according to the preliminary reports of the Timber Resource Review completed by the United States Forest Service in 1955. In arriving at this total forest land area the Forest Service used the following definition of forest land:

> Forest land area includes (*a*) lands which are at least 10 percent stocked by trees of any size and capable of producing timber or other wood products, or of exerting an influence on the climate or the water regime; (*b*) land from which the trees described in (*a*) have been removed to less than 10 percent stocking and which have not been developed for other use; (*c*) afforested areas; and (*d*) chaparral areas. Does not include orchard land. The minimum area that qualifies as forest land is one acre in the East and 10 acres in the West. Roadside, streamside, and shelterbelt strips of timber, in addition to meeting above requirements, must be at least 120 feet wide to qualify as forest land.

It is important to note that chaparral areas are included under this definition. The chaparral land area is defined by the Forest Service as including "lands supporting heavily branched dwarf trees or shrubs, usually evergreen, the crown canopy of which covers more than 50 percent of the ground and whose primary value is watershed protection."

Included in the total forest land area of 648 million acres are 484 million acres of commercial forest land and 164 million acres of noncommercial woodland and forest land. The noncommercial area is made up of 138 million acres of unproductive and unreserved woodland and forest land and 26 million acres (including 11 million unproductive acres) reserved for special purposes such as parks and wildlife refuges.

Commercial forest land is made up of all forest land which (1) "is producing, or physically capable of producing, usable crops of wood (usually sawtimber), (2) economically available now or prospectively, and (3) not withdrawn from timber utilization." When the present commercial forest area of 484 million acres is broken down into stand-size classes, there are 178 million acres of sawtimber stands, 169 million acres of pole timber stands, 95 million acres of seedling and sapling stands, and 42 million acres of nonstocked and other forest areas. Some of this 42 million acres of nonstocked forest land is probably reported under other uses of land in farms by the Census of Agriculture.

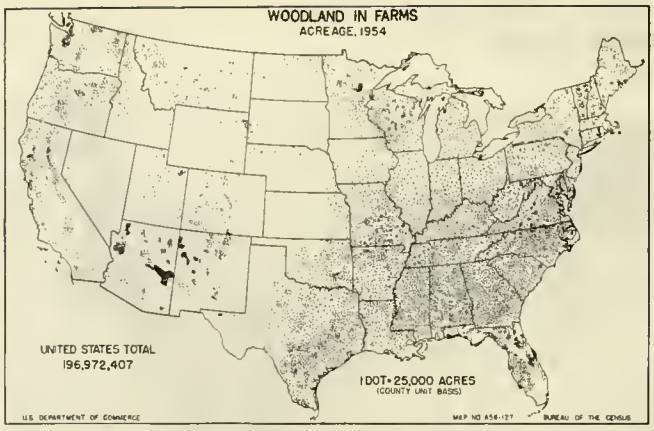
FOREST LAND AREA IN CONTINENTAL UNITED STATES, BY REGIONS, 1953 [1]

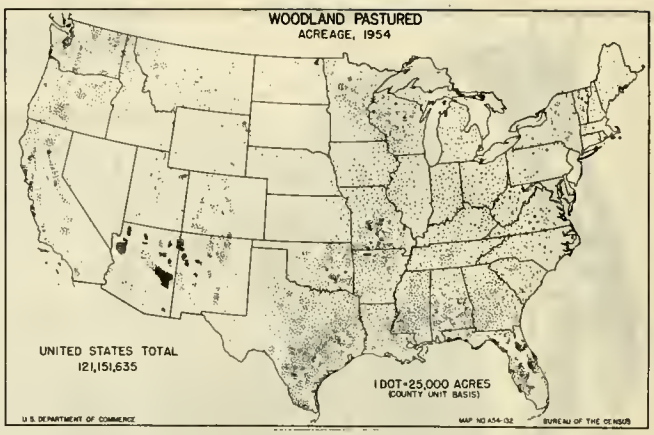
Region	Forest land		
	Commercial [2]	Noncommercial [3]	Total
	1,000 acres	*1,000 acres*	*1,000 acres*
Northeast	63,023	3,342	66,365
Corn Belt	30,948	281	31,229
Lake States	53,272	1,929	55,201
Northern Plains	5,508	244	5,752
Appalachian	67,868	1,439	69,307
Southeast	78,135	1,683	79,818
Delta States	51,631	178	51,809
Southern Plains	18,210	29,827	48,037
Mountain	53,063	90,435	143,498
Pacific	62,682	33,988	96,670
Total	484,340	163,346	647,686

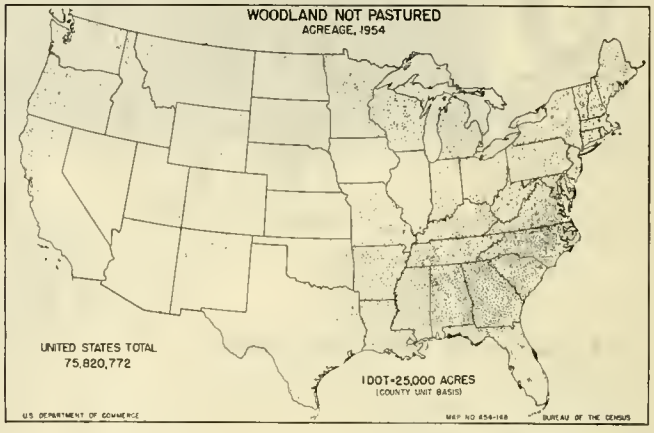
[1] As reported by the U. S. Forest Service, 1955.

[2] Forest land which (*a*) is producing, or physically capable of producing, usable crops of wood (usually sawtimber), (*b*) economically available now or prospectively, and (*c*) not withdrawn from timber utilization.

[3] Forest land (*a*) withdrawn from timber utilization through statute, ordinance, or administrative order but which otherwise qualifies as commercial forest land, or (*b*) incapable of yielding usable wood products (usually sawtimber) because of adverse site conditions, or so physically inaccessible as to be unavailable economically in the foreseeable future.







About 358 million acres of the commercial forest land are privately owned and 126 million acres are publicly owned. The publicly owned forest land is held by Federal, State, and county and municipal governments. About 99 million acres are owned by the Federal Government; 19 million acres, by State governments; and 8 million acres, by county and municipal governments. Farm forests accounted for 165 million acres of the privately owned commercial forest land in 1950.

Distribution of forest land.—The distribution of the total forest area of the United States is shown on the accompanying map. Unproductive as well as productive forest areas are shown. Many of the unproductive areas are valuable for watershed protection purposes. The regional distribution of the total forest land area shown in the accompanying table will assist in locating the major areas of commercial and noncommercial forest land.

From the map, the influence of topography on the distribution of forest land may be observed. In the 31 Eastern States, most of which were originally forested, several rough hilly areas have remained largely forested. In the Western States, rainfall has a marked influence upon the distribution of forest land. However, topography is a major factor in determining rainfall distribution and hence the distribution of the major forested areas. In the 11 Western States, the heaviest rainfall occurs on the windward western slopes of mountains. Because of the favorable rainfall conditions, these wet windward slopes in California, Oregon, and Washington have some of the most luxuriant forests in the United States. In contrast, many of the leeward mountain slopes and the lower parts of windward slopes are covered with chaparral and other noncommercial forest types.

In parts of the Great Plains and 11 Western States, areas that were originally covered by grass vegetation have been invaded by brush-type vegetation which is detrimental to the grazing value of the land. One of the largest brush-invaded areas is in western Texas. The invasion of brush accounts for the relatively high density of woodland in such areas.

Woodland in farms.—For the United States as a whole, woodland in farms accounts for more than a sixth of the farm area. The highest regional proportion is in the Southeastern States where half of the land in farms is woodland. In the Western States, much of the woodland in farms has relatively little commercial value except for northern Idaho and western Oregon and Washington and California. In the East, farm woodlands are generally classified as commercial forest land, but the amount of income derived from the woodland part of the farm varies from practically nothing to a substantial part of the total farm income.

The increase in total woodland and forest land, which amounted to several million acres, reflects a change taking place over the last two decades, particularly in parts of the Southern, Northeastern, and Lake States. Forest surveys completed since 1950 have more fully indicated the gradual reversion of considerable acreages of pastureland and cropland to forest land in these parts of the country.

Much of the decline between 1949 and 1954 in woodland in farms occurred in Texas where more of the brushland area was included in other pasture not cropland and not woodland rather than as a part of woodland pastured. The decline in land in farms during the last 5 years in forested regions also accounts for an appreciable transfer of forest land from land in farms to the nonfarm area.

Woodland pastured.—This part of the woodland area can either be considered as a part of the total pastureland area or part of the total woodland in farms. Its value as pasture has already been discussed under pastureland. In some areas, such as in the longleaf-slash pine forests of the Southeastern Coastal Plain, it is possible to use the forest for pasture without detracting very much from the timber value of the forest. In other areas such as the hardwood forests of the Northeastern, Lake, and Corn Belt States, the use of woodland for pasture is generally not compatible with good forest management.

Woodland not pastured.—The heaviest concentration of nonpastured woodland in farms is located in the Appalachian and Southeastern States. These are also regions with much woodland used for pasture as is shown by the accompanying map. The dominance of such cash crops as cotton, tobacco, and peanuts over extensive parts of these two regions is an important factor accounting for a high proportion of the farm area remaining in forests. Much woodland in this part of the South is physically suitable for crop production. On the other hand, a considerable acreage of woodland in farms in areas of rough topography is not likely to be used for crops or even pastured. These forest areas are often not operated properly from the standpoint of good forest management.

REGIONAL PATTERNS OF LAND RESOURCES AND USES

Land resources differ markedly among the several regions of the United States. Numerous contrasts in the combination of physical conditions give rise to basic differences in the quality of land. These variations in quality in turn have a significant influence on how the land is used. Consequently, regional patterns of land use have developed along lines of relatively broad differences in physical conditions existing in different parts of the United States. Localized differences in physical conditions have more direct influences on land use.

As a resource used in agricultural production, land is of basic importance. In spite of the large increases in the investment in machinery, buildings, and livestock that have occurred during the last 15 years, in 1949 land still accounted for more than half of the capital investment on commercial farms in the United States. In some areas where only a small proportion of the land resources can be used for crop production, land accounts for less of the total investment than in areas that have a high proportion of land of good quality, including land raised to a high level of productivity by irrigation and drainage.

Land quality.—Regional contrasts in the quality of land resources are mainly explained by the following physical conditions: (1) Temperature and the length of the frost-free season; (2) annual amount and seasonal distribution of precipitation; (3) land relief, including degree and direction of slope; (4) soils; and (5) native vegetation wherever it remains nearly in its natural state. Transitions in climate are generally gradual changes, so that a zone rather than a sharp line of change characterizes the separation of one climatic region from another. The principal exception is in mountainous areas where climatic boundaries may be more sharply drawn. Topographic and soil conditions commonly change much more abruptly than climate.

Physical conditions have a significant influence upon the development of general patterns of land use. Thus, grazing of native or improved rangelands is the principal use of millions of acres of land in the Western States which are too dry for crop farming unless irrigated. Rough or mountainous topography relegates large areas to forestry as the main use. The proportion of land used for cropland, pasture, and woodland in a region is also markedly affected by soil and topographic characteristics. Since some crops are sharply limited by climate, selective use of land may prevail in areas suitable for production of some crops, for example, citrus fruits.

The natural environment may be substantially altered by man-made improvements so that land resources which in their original condition were considered of poor quality may become highly valuable when improved. Land improved by drainage and irrigation falls into this category.

Other influences on land use.—The influence of physical conditions on land quality is only one of several major influences affecting regional patterns of land use. The history of land settlement is often highly significant in determining certain characteristics of land use. Early production of cotton as a cash crop for export led to a pattern of land use in the South that placed the principal emphasis upon the production of row crops. Consequently, a less exploitative pattern of use with greater attention given to close-grown crops used to feed livestock has only recently made much progress in areas which from the standpoint of several natural conditions have always been well suited to livestock production.

Control or ownership of the land may also affect its use. Large ownership units used for forestry or grazing may have sizable acreages suitable for use as cropland. If this land were in smaller farms, some of it would undoubtedly be used as cropland. At present, when several farm commodities are in surplus supply, it does not appear probable that much shifting among major uses of land is likely to occur on large ownership units.

Distribution of and change in population may have a marked influence on land use, particularly in localized areas within a region. These changes may in turn add up to a significant change in the regional economy. The large increases in population on the west coast offer an example of how suburbanization and industrial expansion may replace existing agricultural uses of the land. In California, about 800,000 acres of cultivable land have been withdrawn from agriculture during the last 15 years. This represents between 5 and 10 percent of the total cropland acreage. At the same time that these agricultural lands are being transferred to nonagricultural uses associated with the expansion of population, the increased demand for agricultural products, particularly perishable commodities such as dairy products, is an inducement to transfer land from grazing and forestry uses to cropland.

The physical requirements for using land resources for different purposes are not static. They are constantly being changed by the introduction of new varieties of plants, for example, those which are more resistant to drought or cold or less affected by high humidity and moisture conditions. Improved varieties of grain sorghum for the Great Plains, forage and pasture crops for the South, and fast-maturing hybrid corn for Northern States are examples of regional land use changes made possible by applying the results of experimentation.

Likewise, experimental work in the breeding of livestock is facilitating changes in land use. The introduction of more heat- and disease-resistant breeds of cattle from southeastern Asia into the hot humid Southern States is a significant inducement to change established patterns of land use.

Mechanization of crop production has led to far-reaching changes in the distribution of several crops, especially the small grains and more recently cotton. Less productive but level land on the arid margin of crop production, which is well adapted to the use of mechanized equipment, has been substituted for land of good quality subdivided into farms too small for the efficient use of large-scale machinery that is now used in growing and harvesting wheat in the Great Plains.

Regional patterns of land use may also be affected by other conditions, such as the presence of mineral production or industrialization which may affect the labor supply and thus discourage use of the land for agricultural purposes. Comparatively good land cleared and used as cropland may become idle and may gradually revert to forestry or grazing uses in areas where strong competition for labor exists.

Shifts in use of land resources.—Regional shifts in the use and productivity of land resources are taking place. Among the most important changes are the following: (1) Shifting of the production of cash crops, particularly cotton, which has been moving from the Southeast to the Mississippi Delta, western Texas, and California. (2) Increased productivity of hay and other feed crops associated with higher yields and better quality in some regions. (3) Continuous increase in the acreage of improved pasture, including additions to the fenced acreage in some regions. This increase in pastures of better quality is accompanied by an increase in livestock numbers, particularly beef and dairy cattle. (4) Increases in the forest land area in regions where land formerly used for crop production is reverting to pasture and forest.

Maps of regional patterns.—Maps included in this section are intended to give a general understanding of differences in the regional distribution of land resources and how they are used. Two maps present some of the principal geographical aspects of types of farming. Studies of types of farming are carried out in order to classify the production patterns on individual farms in terms of crops grown, livestock and livestock products produced, methods used in production, and sources of income.

The map of "Major Land Use Regions" presents a regionalization based on a grouping of major land uses. The associations of major uses are superimposed upon the principal natural land use regions which in turn are based on the differences in physical conditions that are significant determinants of land use.

In the next two maps presented in this section, the major uses of all land and nonfarm land are compared with total land area by farm-production regions.

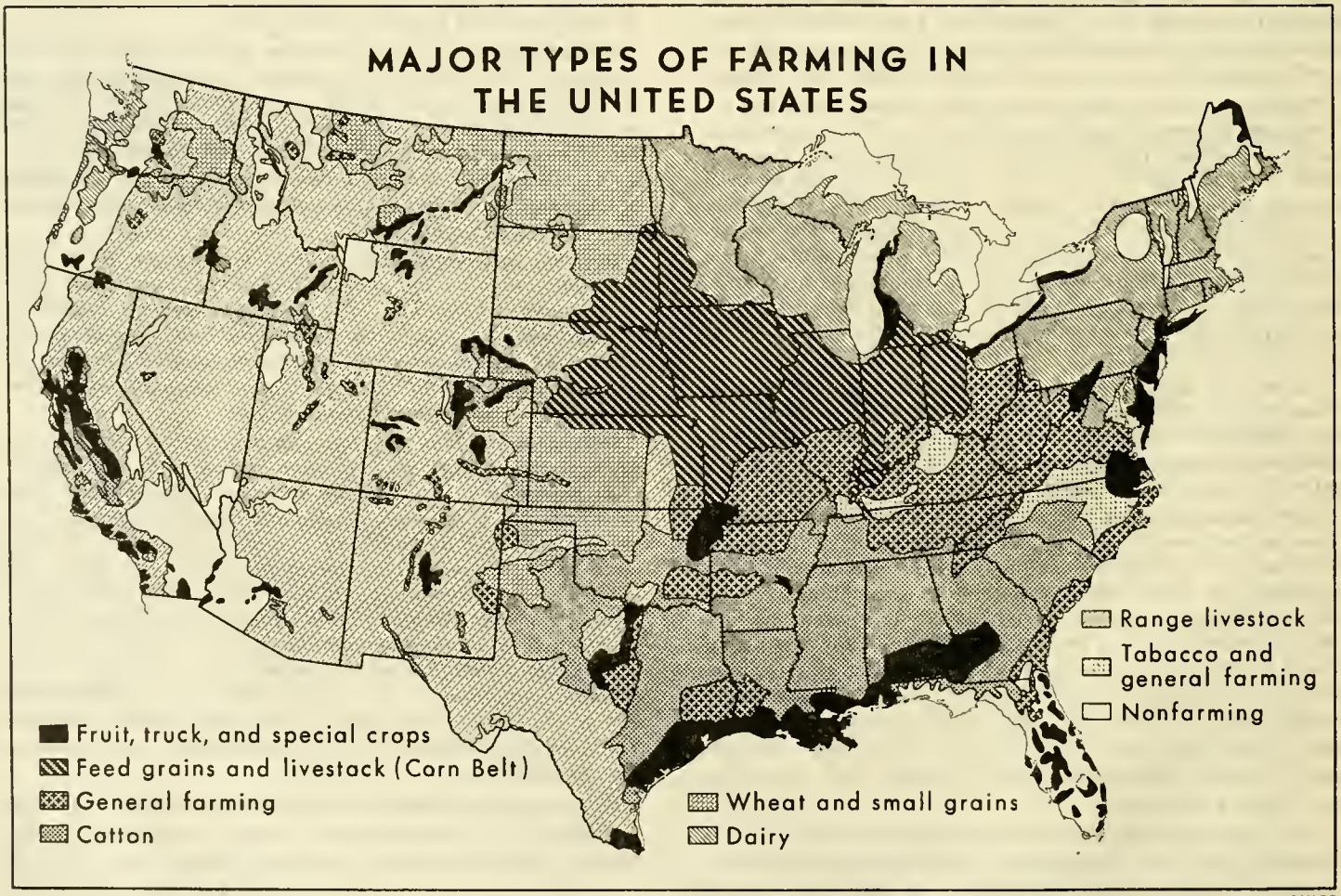
Land capability is compared with total land area by farm-production regions in the last map in the section. This map is based on estimates of land capability compiled in 1948 and 1949 by the United States Soil Conservation Service on the basis of individual farm plans completed at that time and supplemented by estimates for areas where data from farm plans were not available. These land-capability estimates are the result of a program being carried out by the Soil Conservation Service to classify different kinds of land systematically on the basis of the characteristics that determine the capability of the land to produce permanently. Eight general classes are used. Land in Classes I, II, and III can be cultivated with differing degrees of attention to conservation practices. Class IV land should generally be used for crops only once in 6 years or more. Land in Classes V, VI, and VII is unsuited for cultivation, but it can be used for pasture and forestry. Class VIII land is suitable only for wildlife, watersheds, and similar uses.

TYPE OF FARMING

Early type-of-farming studies in the United States were concerned mainly with a geographic regionalization of agriculture. In the 1930 Graphic Summary of American Agriculture, a map was presented which divided the United States into 12 major agricultural regions. The eastern humid area was divided into 8 regions. These regions were based mainly upon the dominance of a particular crop or type of farming. In the West, the 4 regions were based on the use of land for grazing or crops.

The most recent study of types of farming was completed in 1950. In this study, the United States was divided into 165 generalized type-of-farming areas, 61 subregions, and 9 major agricultural regions.

The distribution of farming is closely related to a number of physical, biological, and economic conditions. The type-of-farming pattern reflects the influence of these conditions or forces. Regional divisions show particularly the influence of climate, topography, and soils. In the humid Eastern States, type-of-farming regions tend to have an east-to-west orientation which reflects the significance of temperature. Soils are an important factor influencing the type of farming. This is indicated for example by the close agreement between the prairie soils and the Corn Belt. In the West, rainfall, altitude, and the availability of water for irrigation are the major physical influences upon type of farming.



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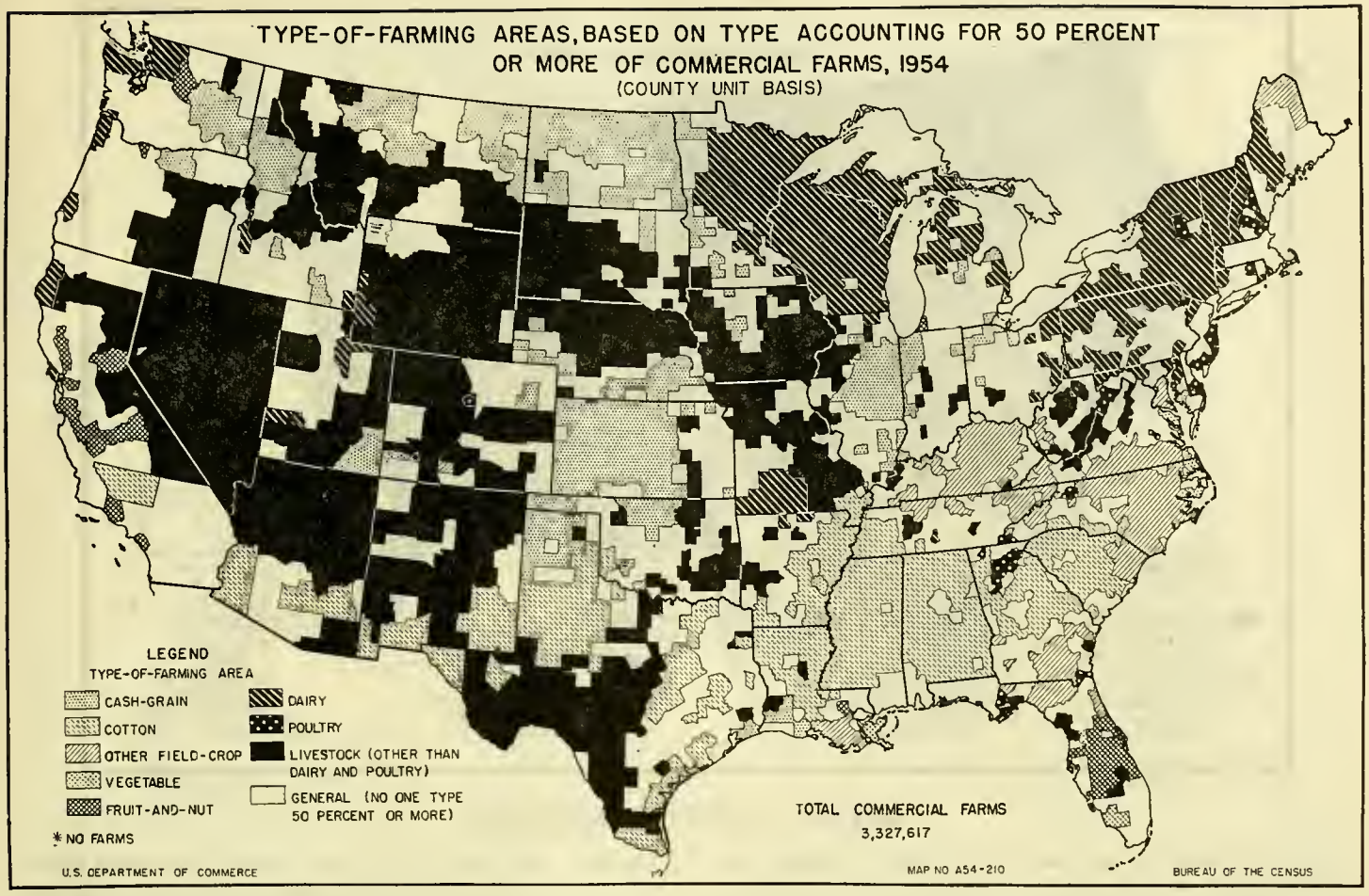


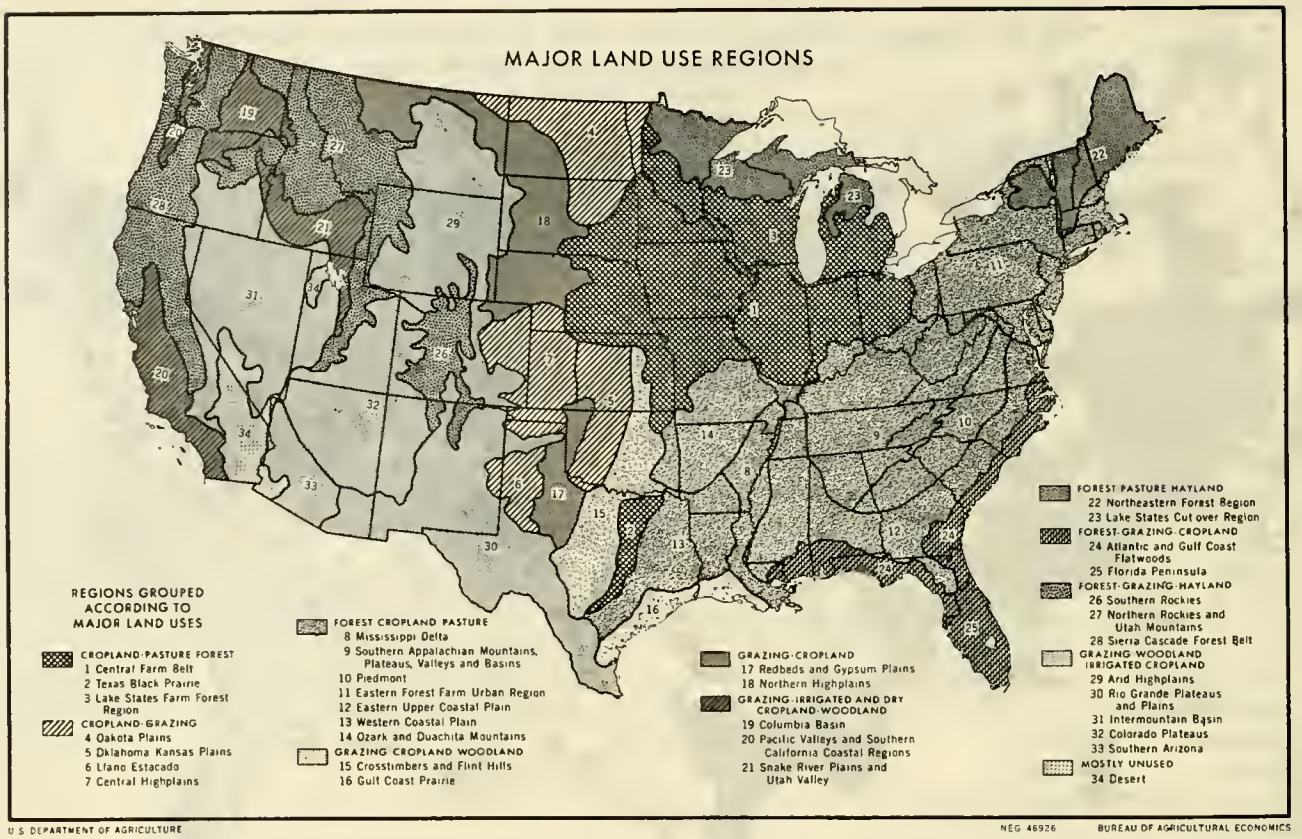
Biological factors that affect the type of farming include weeds, plant and animal diseases, insect pests, and development of new varieties and strains of crops. The introduction of hybrid corn, for example, has brought about a significant enlargement of the Corn Belt, particularly on the drier aud colder margins. The boll weevil has had a striking effect on the area of cotton production.

Several economic forces operate to influence types of farming. The relative ease with which technological improvements can be adapted to regional patterns of farming is an important determinant of the type of farming. Distance of potential producing areas from markets may lead to adjustments in farming. Numerous changes in the technology of producing and marketing farm products have led to shifts in type of farming among regions. The westward migration of wheat production is an outstanding example of a major regional shift in American agriculture brought about to a marked degree by an improvement in production technology.

Institutional influences such as tariffs, freight rate zones, and local sanitary regulations also play a part in the regionalization of farming. Sanitary regulations on the sale of fresh milk have an influence on milkshed boundaries.

Major types of farming.—The accompanying map is based on the more detailed type-of-farming map which shows 165 generalized type-of-farming areas which in turn are grouped into 61 subregions. These 61 subregions have been summarized in the accompanying map in terms of 8 major types of farming. A ninth category shown on the map represents areas in which little or no farming exists. The fruit, truck, and special crops type is the most widely scattered of the major types of farming. Areas of this type are found in nearly every part of the United States. Tobacco and general farming is the most restricted type in terms of area. The feed grains and livestock or Corn Belt type is the most compact area. The cotton and dairy types are found mainly in extensive east-west trending belts in the Eastern States, although these types have their respective western counterparts in California and the Pacific Northwest. The biggest area of general farming is a transitional belt between the Cotton and Corn Belt types. The range livestock type is restricted to the 17 Western States, with most of the area in the 11 Western States and the western parts of Texas, South Dakota, and Nebraska.

Type-of-farming areas.—The distribution of type-of-farming areas in 1954 is shown on a county-unit basis, in the accompanying map. This map is based on type accounting for 50 percent or more of commercial farms. When this map is compared with the map showing major types of farming, which was compiled differently, it may be observed that the overall pattern remains essentially unchanged. The Corn Belt does not appear on this map as a large unbroken type-of-farming area, partly because the type classification has been changed somewhat. Cash grain has been substituted for wheat and small grains so that the cash corn area of Illinois and Indiana becomes a separate area. The increased emphasis on soybean production in the eastern part of the Corn Belt is another significant reason why the Corn Belt is not shown as a separate area.



MAJOR LAND-USE REGIONS

In the accompanying map, the United States is divided into regions grouped according to the major uses of land. Eleven major combinations of land use are delineated. The land-use regions that make up the different combinations are to a marked degree based upon contrasts in physical characteristics. Five different combinations of land use are shown in the 31 Eastern States, 6 different ones are located in the Great Plains States, and 6 are in the 11 Western States.

Three regions are shown with the cropland-pasture-forest combination of uses. In each of these three regions, a high proportion of the total land area is used as cropland. In several counties in the Central Farm Belt, more than four-fifths of all land is cropland and in most of the remaining counties of this region, more than half of all land is used as cropland.

Four land-use regions located in the Great Plains are characterized by a combination of cropland and grazing. Cropland is the dominant use. More than three-fifths of the land is used for that purpose throughout most of the area included in these four regions.

Adjacent to these regions are two other regions grouped under a grazing-cropland category. In these regions, grazing is a more important use of land than cropland. Considerable attention is given to moisture-conserving and wind-erosion control practices on land used for growing crops, for drought is a major threat to agriculture in these regions.

In the Cross Timbers and Flint Hills of Texas, Oklahoma, and Kansas and in the Gulf Coast Prairie of Texas and Louisiana, the land-use combination is grazing, cropland, and woodland. In these two regions, cropland generally occupies less than half of the land area. Woodland areas are often grazed.

Seven regions which comprise much of northeastern and southern United States are grouped under the land-use category of forest, cropland, and pasture. For the most part, cropland occupies less than half of the land area over most of these regions.

In the Northeastern forest and the Lake States cutover regions, the land-use combination is best described as forest, pasture, and hayland. Over much of the area in these two regions there is little or no cropland or pasture. In the areas where agriculture is carried on, pasture is an important use and much of the cropland is used for growing hay crops. Most of the forest land is not grazed.

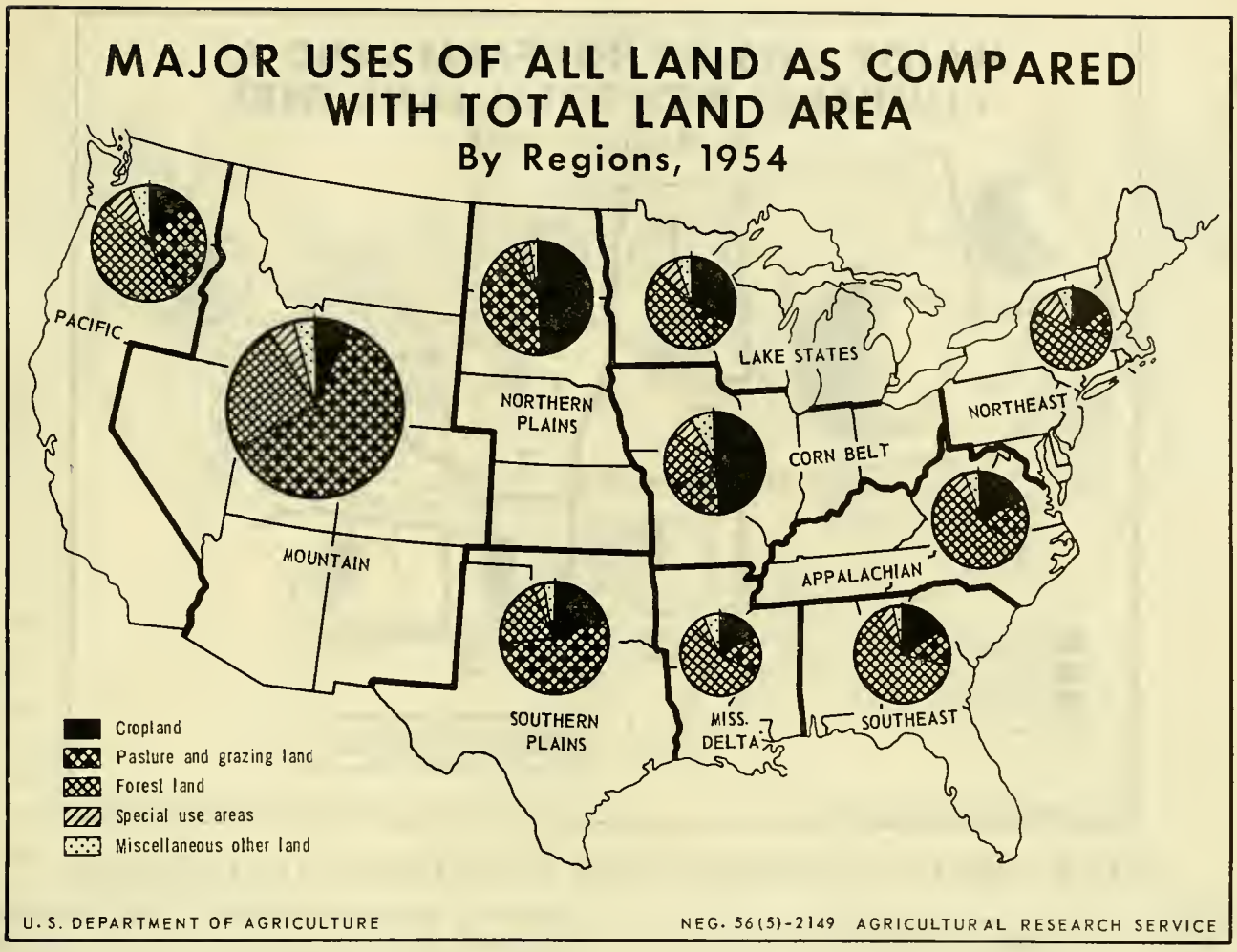
Western counterparts of these two eastern regions are found in the southern Rockies, northern Rockies, and Utah Mountains, and in the Sierra-Cascade Forest Belt. Except for irrigated areas, cropland is of little importance in these three regions.

A third combination of major land uses found in the southeastern coastal plain is very similar in some respects to the two combinations just described for the Northern and Western States. A forest-grazing-cropland combination of uses best describes the land-use pattern of the Atlantic and Gulf Coast Flatwoods and the Florida Peninsula. In these two regions, a high proportion of the land is forested. Cropland accounts for less than a third of the total area with many areas having little or no cropland.

The grazing-irrigated and dry cropland-woodland combination of land use characterizes three regions in the Western States. The presence of a considerable acreage of dry cropland is a distinctive aspect of agriculture in these regions. Irrigated cropland is also of major importance. Land used for grazing generally accounts for a higher proportion of the total area than cropland. Woodland areas are widely grazed.

The grazing-woodland-irrigated cropland combination of major uses is found over extensive areas in the 11 Western States and extends into the western part of the Great Plains States. The regions characterized by this combination of major uses differ from those of the grazing-irrigated and dry cropland-woodland group mainly in having smaller and more widely scattered areas of irrigated cropland and also in having less dry cropland.

The two desert areas are little used for agriculture except where water for irrigation is available, as in the Imperial Valley of California.



MAJOR USES OF ALL LAND BY FARM-PRODUCTION REGIONS

MAJOR USES OF LAND IN CONTINENTAL UNITED STATES, BY FARM-PRODUCTION REGIONS, 1954

Region	Cropland [1]	Pasture and grazing land [2]	Forest and woodland [3]	Special uses [4]	Miscellaneous and other land [5]	Total
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*	*1,000 acres*
Northern:						
Northeastern	18,848	10,963	63,537	11,634	7,396	112,378
Lake States	39,959	11,990	54,451	8,931	7,380	122,711
Corn Belt	80,343	30,546	31,033	10,851	12,610	165,383
Northern Plains	95,820	82,354	5,428	7,836	3,994	195,432
Total	234,970	135,853	154,449	39,252	31,380	595,904
Southern:						
Appalachian	22,870	20,455	68,021	7,600	5,682	124,628
Southeastern	19,964	14,594	78,114	8,476	3,094	124,242
Mississippi Delta	16,179	14,392	51,641	4,371	6,272	92,855
Southern Plains	41,407	114,076	43,099	7,531	6,715	212,828
Total	100,420	163,517	240,875	27,978	21,763	554,553
Western:						
Mountain	36,462	334,821	130,155	26,138	21,093	548,669
Pacific	21,727	64,296	89,905	16,830	11,941	204,699
Total	58,189	399,117	220,060	42,968	33,034	753,368
United States	393,579	698,487	615,384	110,198	86,177	1,903,825

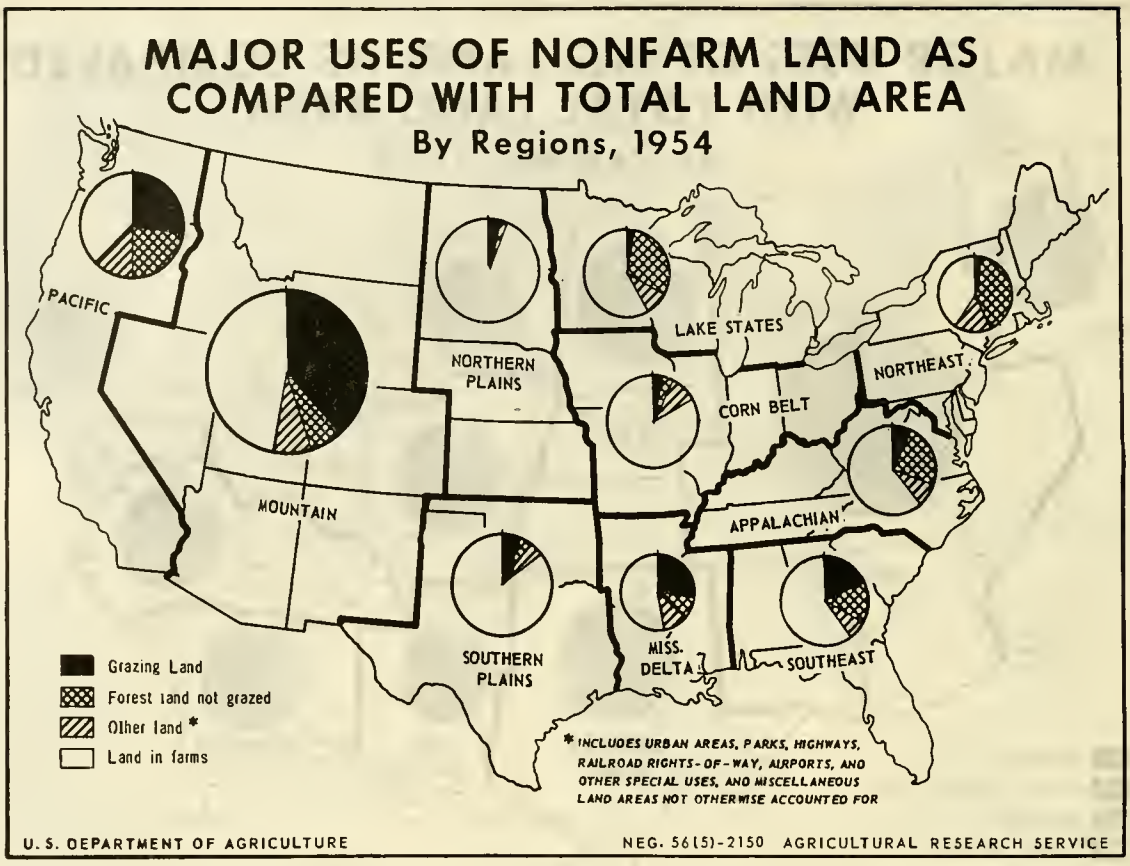
[1] Includes cropland harvested (land from which one or more crops were harvested), crop failure, cropland fallow, cropland used for cover and soil-improvement crops, and cropland temporarily idle.
[2] Includes cropland used only for pasture and all nonforested pasture and grazing land.
[3] Excludes forest land reserved for use in parks, wildlife areas, and other special uses of land. Includes forest and woodland pastured or grazed.
[4] Includes urban areas, rural highways, rural railroads, rural airports, parks, wildlife areas, national defense areas, flood control areas, Atomic Energy Commission areas, farmsteads, farm roads and lanes, State-owned institutional sites, and miscellaneous other uses.
[5] Includes marshes, sand dunes, beaches, bare rock areas, and desert areas not otherwise included under special uses of land.

The regional distribution of major uses of land is shown in the accompanying map and table. In the Corn Belt and Northern Plains States, cropland, excluding cropland used only for pasture, occupies almost half of the total land area of those States. In the Northeastern, Appalachian, and Southeastern regions, forest land accounts for more than half of the area. Nearly half of the total area is in forests in the Pacific and Lake States. In the Mountain States, pasture and grazing land accounts for well over half the total area. In the Great Plains States, nearly half of the land area is used for pasture and grazing.

Special uses of land occupy the highest proportion of the land area in the Northeastern, Pacific, and Lake States. Some of these uses have expanded rapidly in parts of these and other regions. Urban areas and highways have absorbed an appreciable acreage of good land, particularly in the vicinity of large cities. Reservoirs are another special use of land but since the total land area is reduced as reservoirs are established, their occupation of land is not reflected in the accompanying map and table.

The distribution of such special uses as urban areas, highways, railroads, airports, farmsteads, and farm roads is closely related to the distribution of population and farms. Many of the large areas in other special uses such as parks, wildlife areas, and national defense areas are located in the less populated parts of the country.

Miscellaneous unaccounted-for areas occupy from about 2 to 8 percent of the land area in the different regions. In some areas, a considerable acreage of desert land, marshland, sand dunes, and beaches is included in national defense areas, parks, wildlife areas, and similar special uses. Most of this land has little value for agriculture or forestry. Some of it has mineral and other subsurface value.



MAJOR USES OF NONFARMLAND BY FARM-PRODUCTION REGIONS

MAJOR USES OF LAND NOT IN FARMS, CONTINENTAL UNITED STATES, BY FARM-PRODUCTION REGIONS, 1954

Region	Grazing land [1]	Forest land not grazed [2]	Other land [3]	Total land not in farms
	1,000 acres	*1,000 acres*	*1,000 acres*	*1,000 acres*
Northern:				
Northeastern	2,237	47,927	16,484	66,648
Lake States	2,934	37,955	10,563	51,452
Corn Belt	5,572	6,538	15,410	27,520
Northern Plains	4,384	1,525	5,187	11,096
Total	15,127	93,945	47,644	156,716
Southern:				
Appalachian	9,119	29,504	10,018	48,641
Southeastern	22,280	18,775	9,126	50,181
Mississippi Delta	25,389	8,583	8,795	42,767
Southern Plains	12,766	7,283	11,336	31,385
Total	69,554	64,145	39,275	172,974
Western:				
Mountain	211,617	34,212	41,898	287,727
Pacific	56,341	46,008	25,867	128,216
Total	267,958	80,220	67,765	415,943
United States	352,639	238,310	154,684	745,633

[1] Includes forests and arid woodland grazed.
[2] Excludes forest area reserved for use in parks, wildlife areas, and other special uses of land.
[3] Includes special uses of land and miscellaneous other land.

Most of the grazing land not in farms is located in the Western States. A secondary concentration of nonfarm grazing land is found in parts of the South where extensive areas of relatively open forest land are grazed.

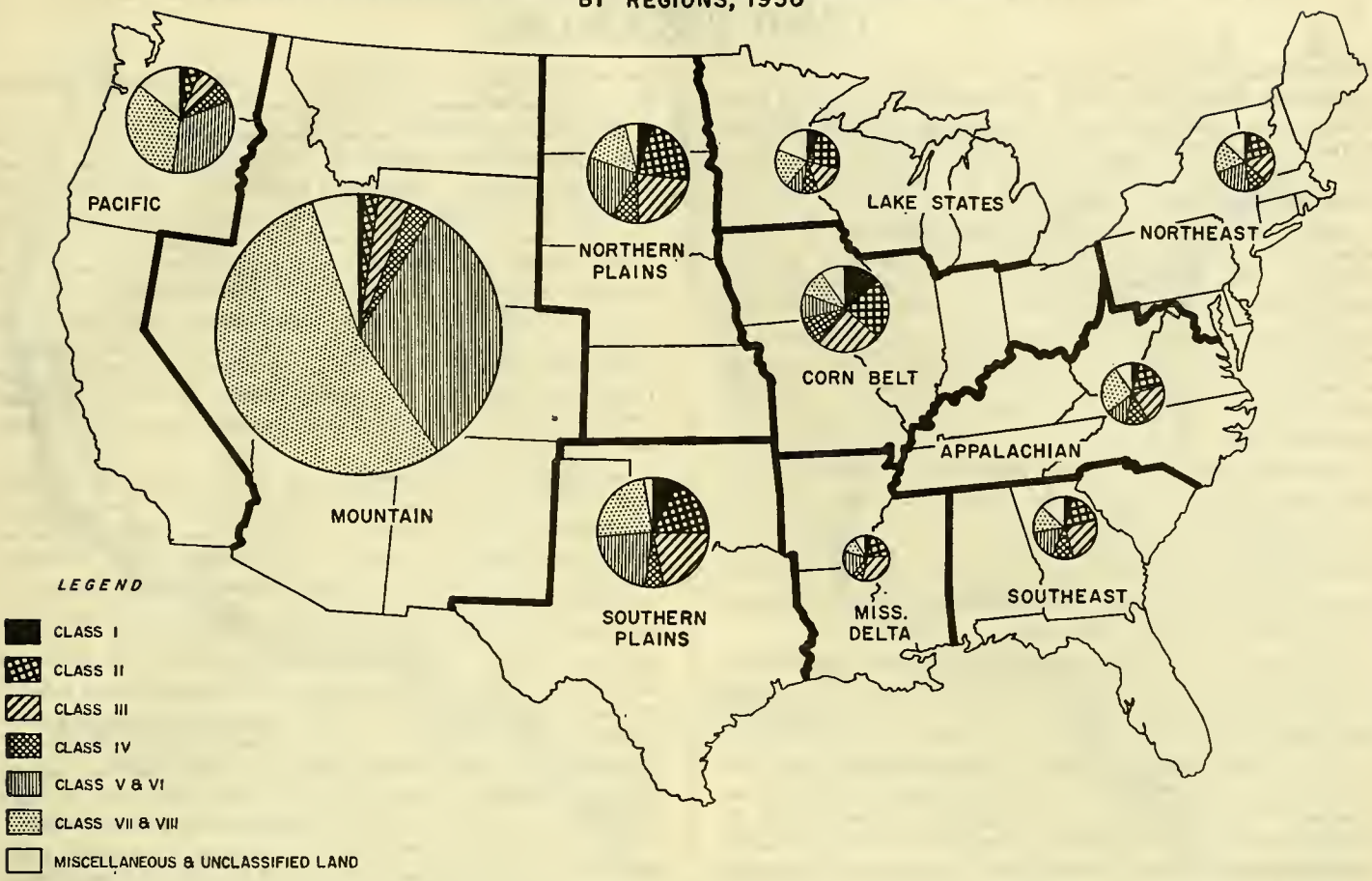
The nonfarm grazing land is about equally divided between open grazing land and forest and woodland used for grazing. The open grazing land is almost entirely located in the 17 Western States. Only rough estimates of the total acreage of nonfarm forest and woodland used for grazing can be made from available information. From these estimates it was determined that about two-thirds of the nonfarm forest and woodland grazed is located in the 17 Western States. Much of the remaining nonfarm forest land used for grazing is located in the Southeastern and Delta States.

This nonfarm forest land and woodland which is suited for grazing is made up mainly of open woodland and forest, scattered cleared and cutover areas, abandoned fields which are reverting to forests, and grazing land covered with high brush. In the West, much of the woodland grazing is in desert shrublands, and such open woodland types as chaparral, pinon, juniper, aspen groves, and brush. Some cutover areas in the Pacific Northwest are grazed. In the Southern States, the open longleaf-slash pine forests, parts of the Ozark forest land, cutover areas, abandoned fields reverting to forest and semiprairie areas make up most of the nonfarm forest land and woodland used for grazing. In the Northern States, cutover land and abandoned fields account for much of the nonfarm forest and woodland grazed.

Nearly three-fourths of the total grazing land not in farms is publicly owned land. In the 11 Western States, about five-sixths of the grazing land not in farms is Federally owned land. In the Southern States, large privately owned forest holdings account for much of the nonfarm grazing land.

Other land not in farms includes the special uses of land which are not a part of land in farms and other miscellaneous unaccounted-for areas not in farms. Special uses of land in farms include farmsteads, farm lanes and roads, and a part of the rights-of-way of highways and railroads. Although the rights-of-way for highways and railroads are not really a part of land in farms some of the acreage in these uses is included as land in farms because farmers tend to use round figures in reporting their acreage of land in farms. Frequently, this does not allow actual use of land for roads. This is particularly true in parts of the country that are covered by the rectangular land division of the public domain.

LAND CAPABILITY AS COMPARED WITH TOTAL LAND AREA BY REGIONS, 1950



LAND CAPABILITY BY FARM-PRODUCTION REGIONS

The accompanying map and table give a generalized picture of land capability by regions. The land capability inventory currently being made by the Soil Conservation Service eventually will obtain for the whole country the information needed about land conditions. This information will permit better decisions to be made pertaining to the uses most suitable for different kinds of land in order to maintain its productivity.

The land-capability classification divides land into eight general classes which in turn are subdivided into subclasses and units according to more detailed characteristics pertaining to kind of limitations on use and necessary management practices. These land classes indicate the degree of risk involved in using the land for different purposes. Class I land is level and easy to farm with little or no danger from erosion. There are an estimated 72 million acres of Class I land for the country as a whole. More than half of this Class I land is located in the North Central States.

Land in capability Classes II and III is also suited to cultivation if certain limitations such as slope, sandy soil, tight subsoil, or other permanent limiting features are kept in mind in using it. Class II land needs such easily applied practices as contouring, protective cover crops, and simple water management practices. Class III land can be cultivated safely only if careful attention is given to such conservation measures as terracing and strip-cropping on slopes and good water management on flat areas. The regional distribution of this land in Classes II and III is shown in the accompanying map. The total acreage is about equally divided between Class II and Class III land.

Land in capability Class IV must be cultivated with extreme care. It should be used only occasionally for cultivated crops. Its best use is for hay crops or pasture.

Land in Classes V, VI, and VII is not suited to cultivation but it may be used for grazing or forestry. Class V land has few restrictions when used for grazing or forestry, while land in Classes VI and VII have moderate to severe limitations when used for these purposes.

The land included in Class VIII is extremely arid, rough, steep, stony, sandy, wet, or severely eroded. Some examples of Class VIII land are rocky foothills, rough mountain land, bare rock outcrops, coastal sand dunes, much marsh and swamp land, and very arid land not suited for any grazing.

LAND CLASSIFIED ACCORDING TO CAPABILITY BY FARM-PRODUCTION REGIONS[1]

Region	Classes I, II, and III	Class IV	Classes V and VI	Classes VII and VIII	Miscellaneous and unclassified	Land area total
	Million acres	*Million acres*	*Million acres*	*Million acres*	*Million acres*	*Million acres*
Northeastern	40.7	12.1	24.6	21.8	13.1	112.3
Corn Belt	101.9	17.0	15.8	16.3	14.4	165.4
Lake States	53.9	10.8	10.0	24.5	23.5	122.7
Northern Plains	97.1	17.6	42.5	30.1	8.1	195.4
Appalachian	50.9	15.4	13.1	32.7	12.5	124.6
Southeastern	56.1	13.8	20.4	17.7	16.3	124.3
Mississippi Delta	50.1	6.1	18.6	10.6	7.5	92.9
Southern Plains	98.6	12.3	45.3	51.0	5.6	212.8
Mountain	30.6	13.8	177.7	296.3	30.3	648.7
Pacific	24.2	13.0	67.8	70.8	28.9	204.7
United States	604.1	131.9	435.8	571.8	160.2	1,903.8

[1] Estimates compiled in 1948–49 by Soil Conservation Service. Adjusted slightly on basis of 1950 Census of Agriculture figures.

CONSERVATION, DEVELOPMENT, AND IMPROVEMENT OF LAND RESOURCES

Conservation.—The total land area of the United States is approximately 1,904 million acres. This constitutes the total land-resource base, which is made up of land of differing qualities. Estimates made in conjunction with the land-capability inventory conducted by the United States Soil Conservation Service reveal that only about a third of the total land area is suited to cultivation. Some of this cultivable land has severe limitations when cultivated and some of it should be cultivated only occasionally. The remaining acreage can be used for such purposes as grazing, forestry, wildlife, and watershed protection. Conservation of all the Nation's land resources for the uses for which they are best suited is needed. Using the land to produce as many of the products that are in demand while exercising care to protect and improve it constitutes the true meaning of conservation.

A growing appreciation of the need for the conservation of basic resources such as soil, water, forests, grassland, and wildlife has resulted in the development of programs aimed at the wise use of the natural resources that are a vital part of the Nation's wealth. Past misuse of these resources has occurred and several abuses remain that need correcting before desired goals in conservation can be attained.

Land used for cultivated crops creates the greatest opportunity for damage or loss to soil resources. Physical soil deterioration on these lands includes erosion by runoff water, wind erosion, deterioration of structure, alkali accumulation, and waterlogging. Not included are losses of organic matter and plant nutrients which are to be expected in crop production and which may be replaced. While physical soil deterioration is preventable, it continues to occur largely because of existing economic and institutional obstacles to the increased use of conservation measures where they are needed.

Through physical soil deterioration of one kind or another, 35 million acres of land originally suited for cultivated crop production are no longer usable under present conditions for that purpose. This does not include 50 to 100 million acres of land that were not originally suited for cultivation, which were cultivated and which following deterioration have been abandoned for cultivation. Also not included are several million additional acres lost from cultivation through expansion of urban and industrial areas, building of transportation facilities, and the construction of reservoirs.

Loss of cropland through soil erosion and other types of deterioration is continuing at the rate of about one-half million acres a year. If no remedial action is taken, the soil may degrade one capability class within 10 to 15 years on 121 million acres of the 478 million acres of cropland reported by the 1950 Census of Agriculture. This may be considered a critical rate of deterioration. On another 128 million acres, degrading to the next capability class may take from 15 to 30 years. Little or no deterioration is occurring on the remaining 229 million acres.

In order to retard the Nation's loss of vital soil resources on its best land, a concerted effort is underway to carry out such needed soil and water conservation practices as contour farming, cover cropping, stripcropping, terracing, stubble mulching, and soil-conserving crop rotations.

The natural grazing lands are another resource to which conservation measures must be applied if this valuable resource is to be properly maintained. The Soil Conservation Service has estimated that roughly 150 million acres of rangeland are in need of brush control. This is largely in the Southwest where infestation of rangeland with undesirable vegetative growth has taken place over extensive areas. Another estimated 96 million acres of rangeland is in need of reseeding. Stock-water development is also needed for approximately 237 million acres of rangeland, if better distribution of grazing is to be attained and overgrazing is to be lessened near existing sources of water.

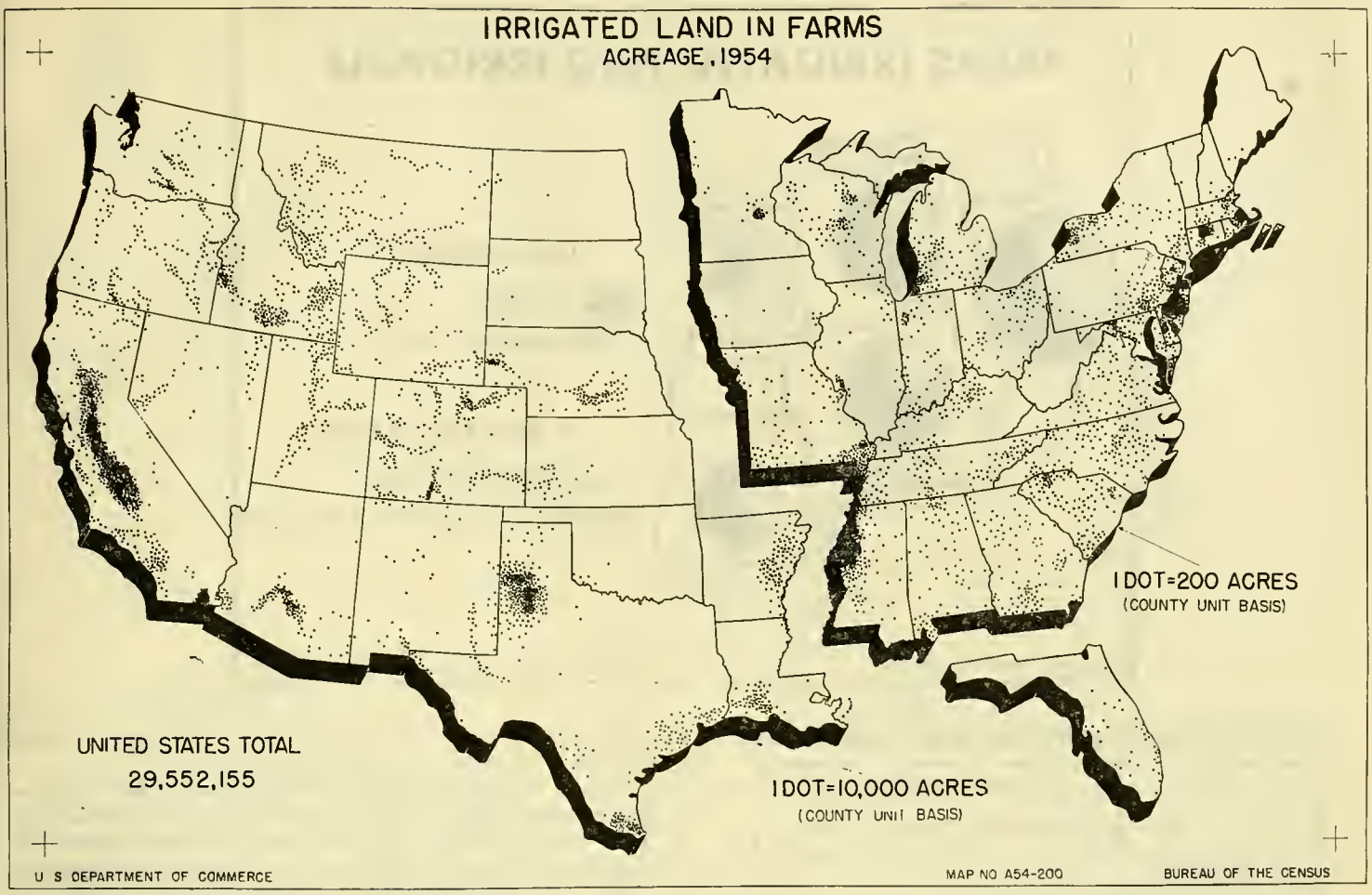
When the forest resources are likewise reviewed, it is apparent that continuing improvement in the conservation of the Nation's forests is desirable. Although a fourth of the total land area of continental United States is in commercial forest land, the Nation does not have an excess of forest land in the light of estimates of future requirements for forest products. There is considerable room for improvement of the existing commercial forest land, which totals 484 million acres for continental United States. A fourth of it is poorly stocked or is not stocked at all. About 50 million acres will need to be replanted before this land can become productive forest land. Long-range planning in the field of forest-resource conservation is needed to provide adequately for future and present requirements.

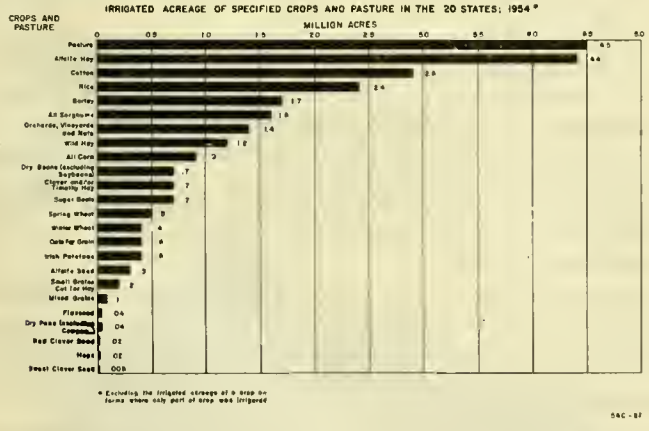
Development and improvement of land.—Present development and improvement of land is not comparable to the large-scale pioneering and homesteading of new areas that were so important during the settlement period in American history. However, considerable development and improvement of land, much of it on existing farms, is still taking place. The development of land includes the preparation of unimproved or presently nonarable land for crops and improved pastures by carrying out such practices as installing drainage, clearing woodland or brush, removal of stones or old stumps, and leveling, ditching, or terracing unimproved land for irrigation. Improvement of land refers to the application of these various measures to land that is presently used as cropland or improved pasture, but which can be made more productive by carrying out additional land improvement.

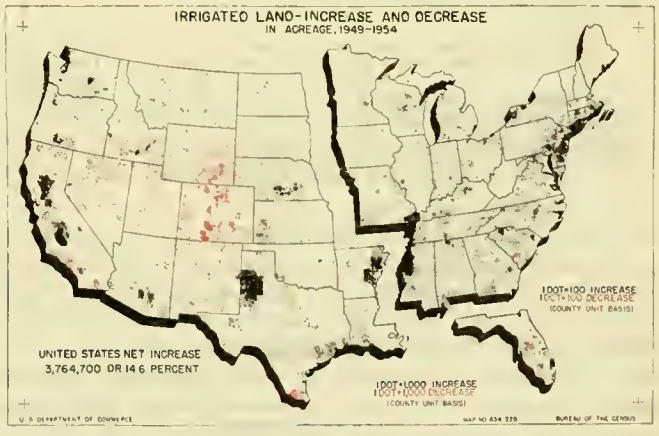
Many farmers have only limited acreages of cropland available with which to expand the farm business. On many small farms on which capital and land resources are limited, more effective use of existing land resources in the farm unit may be possible by carrying out certain development or improvement measures. Some farmers may be able to obtain more cropland by buying nearby tracts of land, but for many this opportunity may not be available. Operators of large farms may have a choice of making more intensive use of the existing acreage of improved land or of developing additional land in the farm.

Development and improvement of land by irrigation continues to expand. During the last decade, the acreage irrigated has increased by 9 million acres. About half of this increase represents the development of new cropland. The remainder is the irrigation of dry cropland in the West and the supplemental irrigation of cropland in the humid Eastern States. The productivity of some of the land already being irrigated in the West also may be increased by supplementing the existing sources of water with additional water from new irrigation works. Leveling and releveling of land is an important aspect of development and improvement of land by irrigation in some areas.

The drainage of land for agricultural uses has been a major practice in the development and improvement of land for many years. Approximately 65 million acres were in organized drainage enterprises at the time of the first Census of Drainage taken in 1920. Land in organized drainage enterprises in 1950 totaled 103 million acres, including about 4 million acres of drainage in irrigation districts. Only about 82 million acres of the land in drainage enterprises is improved. The Soil Conservation Service has estimated that supplemental drainage is needed on 31 million acres presently used for cropland and pasture. An additional 21 million acres are potentially drainable. About 17 million acres of the potentially drainable land are mainly outside existing organized drainage enterprises. The other 4 million acres are a part of the 21 million acres of unimproved land estimated to be a part of the land reported in organized drainage enterprises in 1950.







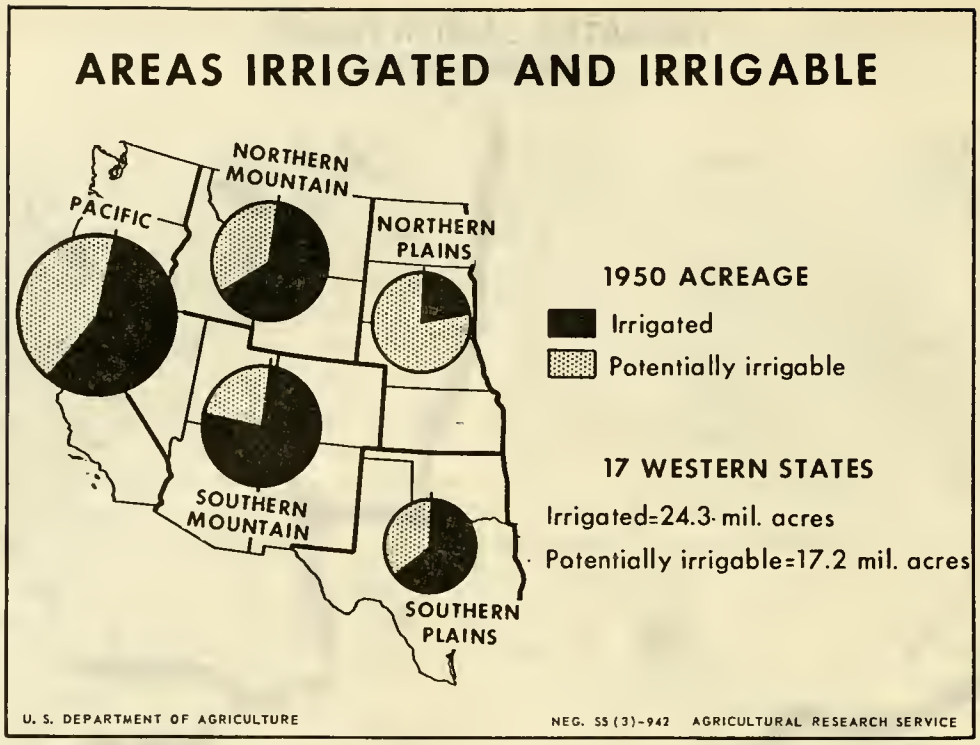
IRRIGATED LAND

Distribution, use, and trend in acreage are some of the significant aspects of irrigation shown by the accompanying maps and charts.

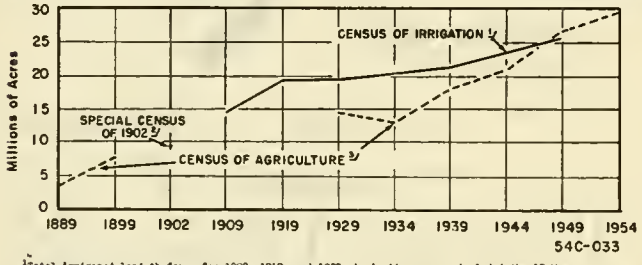
Irrigated land in farms.—Most of the irrigated land is concentrated in the 11 Western States and Texas. Lesser concentrations are found in Nebraska, Kansas, Arkansas, Louisiana, and Florida. The accompanying map uses two different ratios of dots to acreage in order to show the distribution of irrigated land in Western and Eastern States. In the 28 Eastern States shown as a separate block in the accompanying map, the heaviest concentrations of irrigated land are associated with the production of such crops as vegetables in New Jersey and Delaware, tobacco and vegetables in Connecticut, rice in the Delta of Mississippi, and fruit on the southeastern shore of Lake Michigan.

Irrigated acreage of specified crops and pasture.—Pasture occupies more irrigated land than any one crop. Some of the irrigated pasture is improved but pastures of native grasses adjacent to streams are also irrigated under favorable conditions. Alfalfa hay and cotton are the two leading crops on irrigated land. These are followed by rice; barley; sorghums; orchards, vineyards, and nuts; and wild hay. These crops aud pasture account for about two-thirds of the irrigated acreage.

Irrigated land, increase and decrease in acreage, 1949–54.—Widespread increases in the acreage of irrigated land are shown by the accompanying map. Decreases are mainly concentrated in Colorado, Wyoming, and Nevada. Many of these areas of decrease are associated with a severe water shortage in 1954 and the decreases are probably only temporary. Smaller areas of decrease near metropolitan areas such as Los Angeles and San Francisco are explained by the suburban spread of population and growing competition between urban and agricultural uses for available water and land.



ACREAGE OF IRRIGATED LAND IN THE UNITED STATES: 1889-1954



[1]Total irrigated land th farms for 1909, 1919, and 1929, irrigation census included the 17 Western states Arkansas, and Louisiana; for 1939 and 1949, Florida also included.
[2]Total irrigated land, all states.
[3]For 1889 and 1899, census total for irrigated land in farms included the 17 Western States, Arkansas and Louisiana; for 1929, irrigated land from which crops were harvested, same 19 States; for 1934, irrigated crops, same 19 States; for 1939, irrigated cropland harvested plus irrigated pasture, 48 States. For 1944, 1949, and 1954, total irrigated land 48 States. Data for 1909 and 1919 not available.

In the 17 Western States the most pronounced increases occurred in the High Plains of Texas, where ground water supplies are being used for irrigation; in the Central Valley of California; in southern Arizona; in the Willamette and Klamath Valleys of Oregon; in the Columbia Basin of Washington; along the Snake River in Idaho; in south-central Nebraska; and in western Kansas. Increases were also pronounced in the rice growing areas of Arkansas, Louisiana, and Texas. In the Delta of Mississippi, irrigated acreage expanded rapidly as rice production increased in that area. The expansion of irrigation between 1949 and 1954 in the Eastern States was much greater and more widespread than the increases in these States between 1944 and 1949.

Areas irrigated and irrigable.—In the above map, the 1950 irrigated acreage is compared with the potentially irrigable area by regions for the 17 Western States. Among the 5 regions shown, the 3 Pacific States have both the largest irrigated acreage and the greatest potentially irrigable area. The Northern Plains States have irrigated the smallest proportion of their total irrigable area.

With the available water supply and with present conservation practices and distribution methods only about 3 in each 100 acres in the West can be irrigated for crop production. Nearly a third of the 24 million acres irrigated in the 17 Western States in 1949 needs additional water in order to have a full season's supply for crop production.

Acreage of irrigated land in the United States, 1889 to 1954.—The acreage of land irrigated in 1954 totaled 29.6 million acres. This total is 3.8 million acres more than the acreage reported irrigated in 1949 and 9 million acres more than was irrigated in 1944. The regional distribution of the net increase between 1949 and 1954 is as follows:

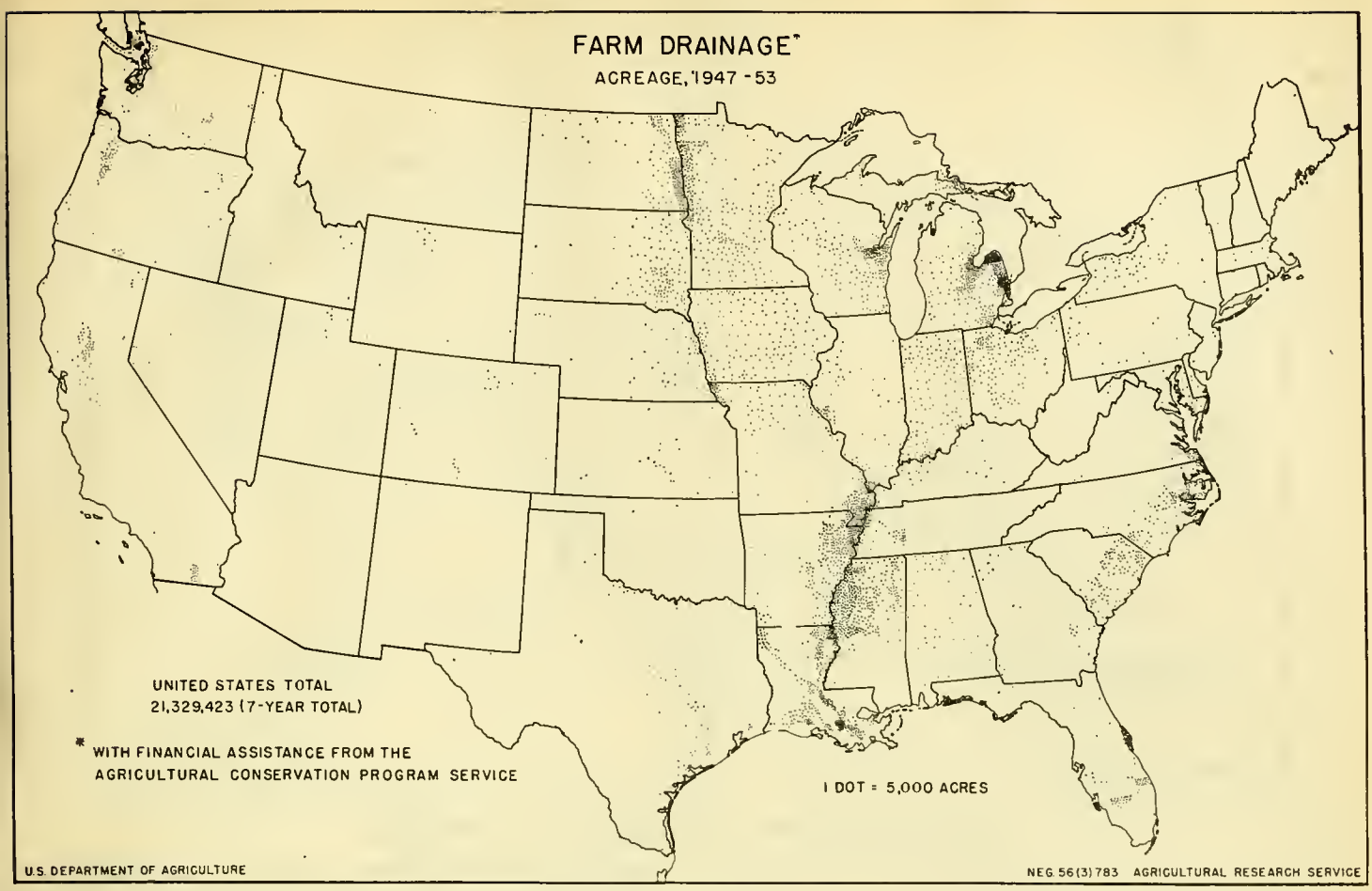
11 Western States	0.5 million acres.
6 Great Plains States	2.2 million acres.
31 Eastern States	1.1 million acres.

Decreases were reported for only 6 States; and of these the amount was significant only in Colorado, Wyoming, and Nevada. The largest increase was reported in Texas. In the Eastern States where the total acreage of land presently irrigated is comparatively small, large percentage gains in land irrigated were generally characteristic.

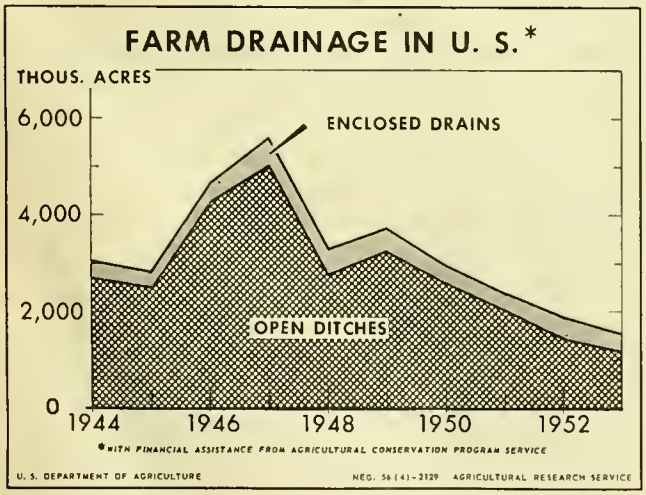
Some of the gain in the humid States took place in the rice-producing areas of Arkansas, Louisiana, Mississippi, and southeastern Texas; but an increasing number of farmers in the East were using irrigation to supplement rainfall, which may be deficient in some years.

Supplemental irrigation is being used on a wide variety of crops and on improved pastures. For intensively grown vegetables and fruits, irrigation in the East is generally accepted as profitable if other conditions are favorable. Tobacco is also a high-value crop for which many growers have successfully used irrigation. For field crops and pastures, fewer data are available on the returns from irrigation in humid areas.

The recent widespread interest in irrigation in the humid Eastern States stems from several conditions. For one thing, new lightweight portable equipment for sprinkler irrigation has been developed. This eliminates ditches and leveling and makes it possible to control the application of water. Recent droughts in parts of the Eastern States, which have coincided with periods of higher prices for farm products, have encouraged many farmers to make an investment in irrigation equipment. During the years following World War II, farmers were financially able to make this substantial investment necessary to install an irrigation system.



DRAINAGE



The artificial drainage of land that does not have good natural drainage has brought millions of acres of good land into agricultural use. An important part of the Nation's most productive land has been improved by drainage.

Organized group drainage enterprises, which are generally responsible for construction of canals and ditches, are frequently necessary prerequisites to the establishment of good farm drainage works. Cooperative effort among farmers is necessary in order to build these main outlets for field drains. The success of both group and farm drainage enterprises is largely determined by careful planning based on good soil and engineering surveys, by careful consideration of expected benefits in relation to costs, and by sound financial planning. After an enterprise is established, close cooperation must continue if the project is to be adequately maintained.

Farm drainage.—The distribution of the acreage drained during a 7-year period from 1947 to 1953 for which county data were available indicates the chief areas in which farm drainage is being carried out in the United States. The North Central States, Mississippi Delta, and Southeastern Coastal Plain are the principal regions in which farm drainage has been a significant land-improvement practice. The acreage drained during the 7-year period covered by the map totaled more than a million acres for each of the following States: Michigan, Louisiana, Mississippi, Minnesota, Arkansas, and Wisconsin. Ten other States each had more than one-half million acres drained during the 7-year period. Most of the drainage was by open ditches (18 million acres). Tile drainage totaled approximately 3 million acres. Two-fifths of the tile drainage was installed in Ohio, Iowa, Indiana, and Michigan.

Farm drainage in United States.—From 1944 to 1953, Agricultural Conservation Program assistance was rendered in draining nearly 32 million acres of farmland, or an average of about 3 million acres a year for this 10-year period. Much of this acreage was drained with the technical assistance of the Soil Conservation Service. The amount of farm drainage carried out annually is shown in the accompanying chart. Not all of this acreage is newly drained land. A considerable part of the drainage carried out under the Agricultural Conservation Program is on land that has previously been improved to some extent by drainage.

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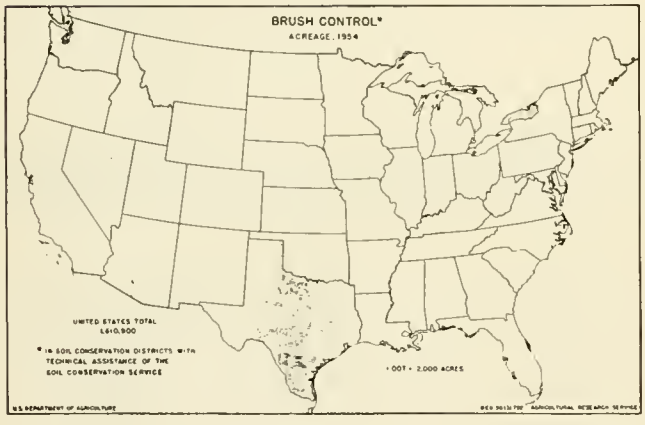
LAND CLEARING AND BRUSH CONTROL



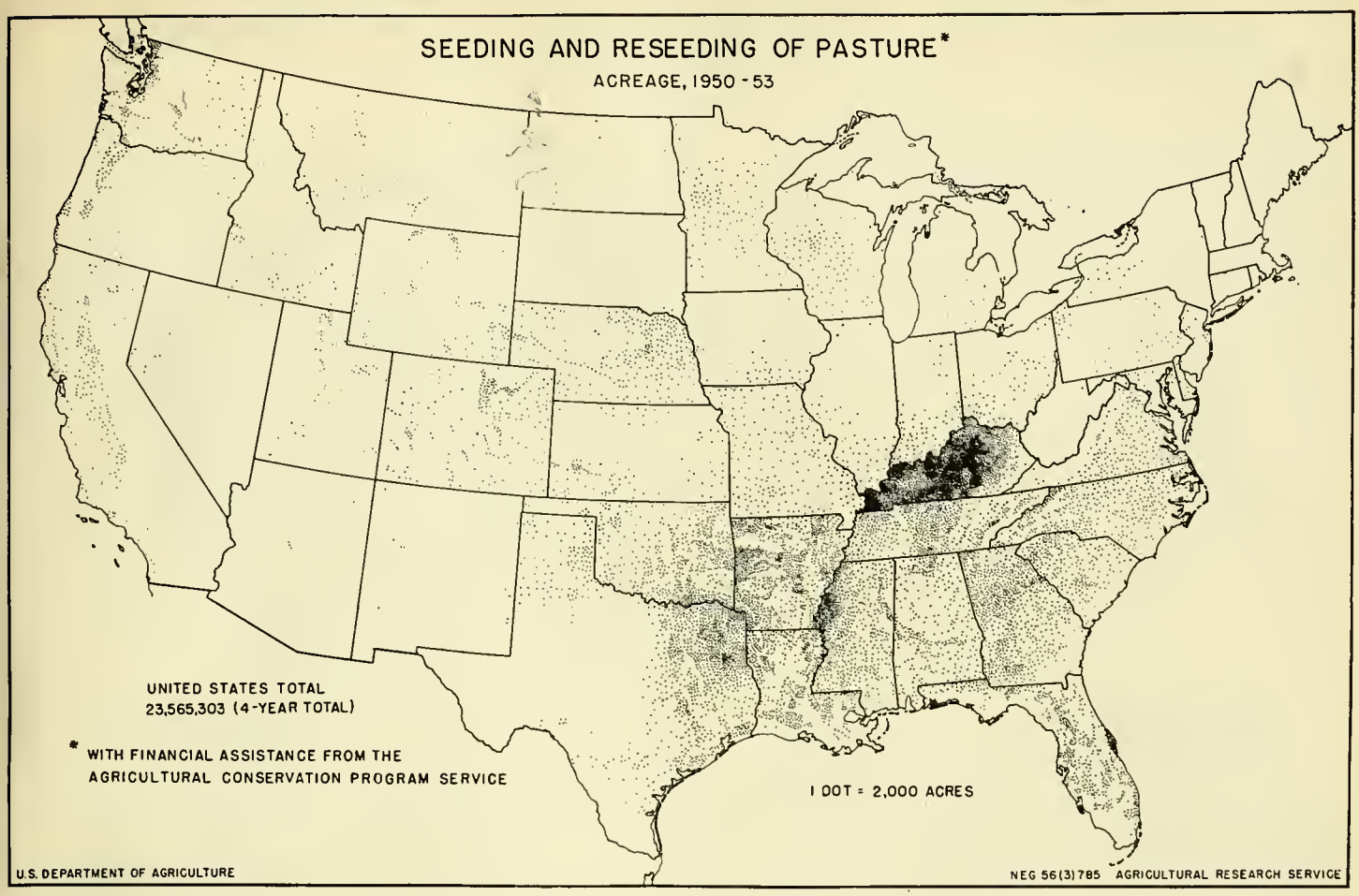
Land clearing.—Land is still being developed for crops and pasture by clearing. Although the total acreage cleared for the country as a whole in any one year is relatively small, clearing of land has considerably greater significance in some areas.

In recent years, the increased use of large-scale mechanical equipment has made possible rapid and economical clearing operations. Some of the new machinery and techniques were developed during World War II in clearing airfields and camp sites in jungle areas. These new machines and techniques make it possible to clear large tracts in a few weeks in contrast to the few areas that formerly could be cleared each year.

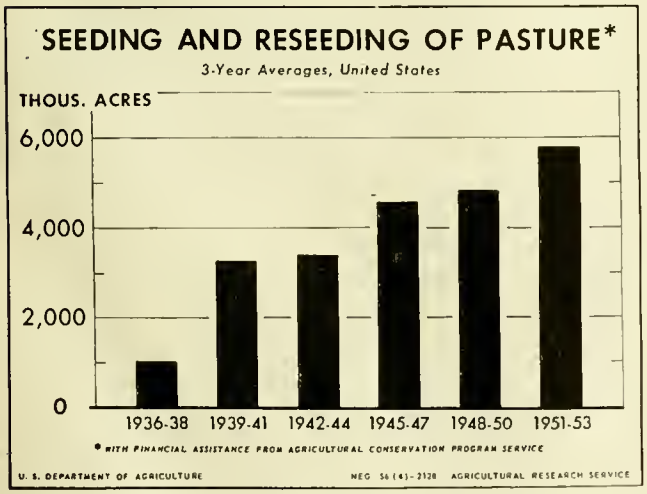
The distribution of the acreage cleared in 1954 with technical assistance from the Soil Conservation Service gives a fairly good indication where land is presently being developed by clearing. In some areas, such as in Tennessee, Missouri, and Pennsylvania, the map shows practically no clearing because only a part of these States were included in soil-conservation districts in 1954. Most of the clearing is concentrated in the Southern States. For the most part the land currently being cleared has been previously cutover for timber or cleared for agriculture. Some of the clearing is being carried out in conjunction with drainage and irrigation.

Land is being cleared for several different uses and purposes. Some farmers are clearing patches of woodland and brush in order to enlarge, consolidate, or reshape fields in order to make more efficient use of tractor-drawn equipment. For other farmers, clearing a few acres of woodland provides an opportunity to expand the cropland base of the farm. Land is also being cleared on farms in order to obtain land best suited for the production of certain specialized crops such as tobacco, rice, citrus fruit, and some vegetables which require rather specific soil and slope conditions. For example, land cleared in recent years in northeastern Arkansas has been cleared mainly for rice production. Another impetus to land clearing springs from the need for more improved pastureland on farms in the South which are making basic changes in type of farming. Increased emphasis on beef cattle production in the Black Belt of Alabama and Mississippi and on dairy production in favorably located parts of the Piedmont have led to the clearing of land for improved pasture. On the cattle ranches of central Florida, land clearing must frequently precede the seeding of improved pastures which are needed to complement the forage supply from native rangeland and woodland.

Brush control.—Brush control is considered as a separate practice from land clearing. It is an important practice in the Southwest, particularly Texas, where undesirable woody plant species have invaded native rangelands. A wide variety of noxious plants such as mesquite, scrub oak, and creosote have become widespread on these rangelands. The spread of these plants has resulted partly from overgrazing and partly from unfavorable climatic conditions such as drought, flood, and hard winters. Fire and wildlife have also contributed to the spread of brush. Mechanical and chemical controls of various kinds are being used in an attempt to eradicate or control further spread of these noxious plants.



PASTURE IMPROVEMENT

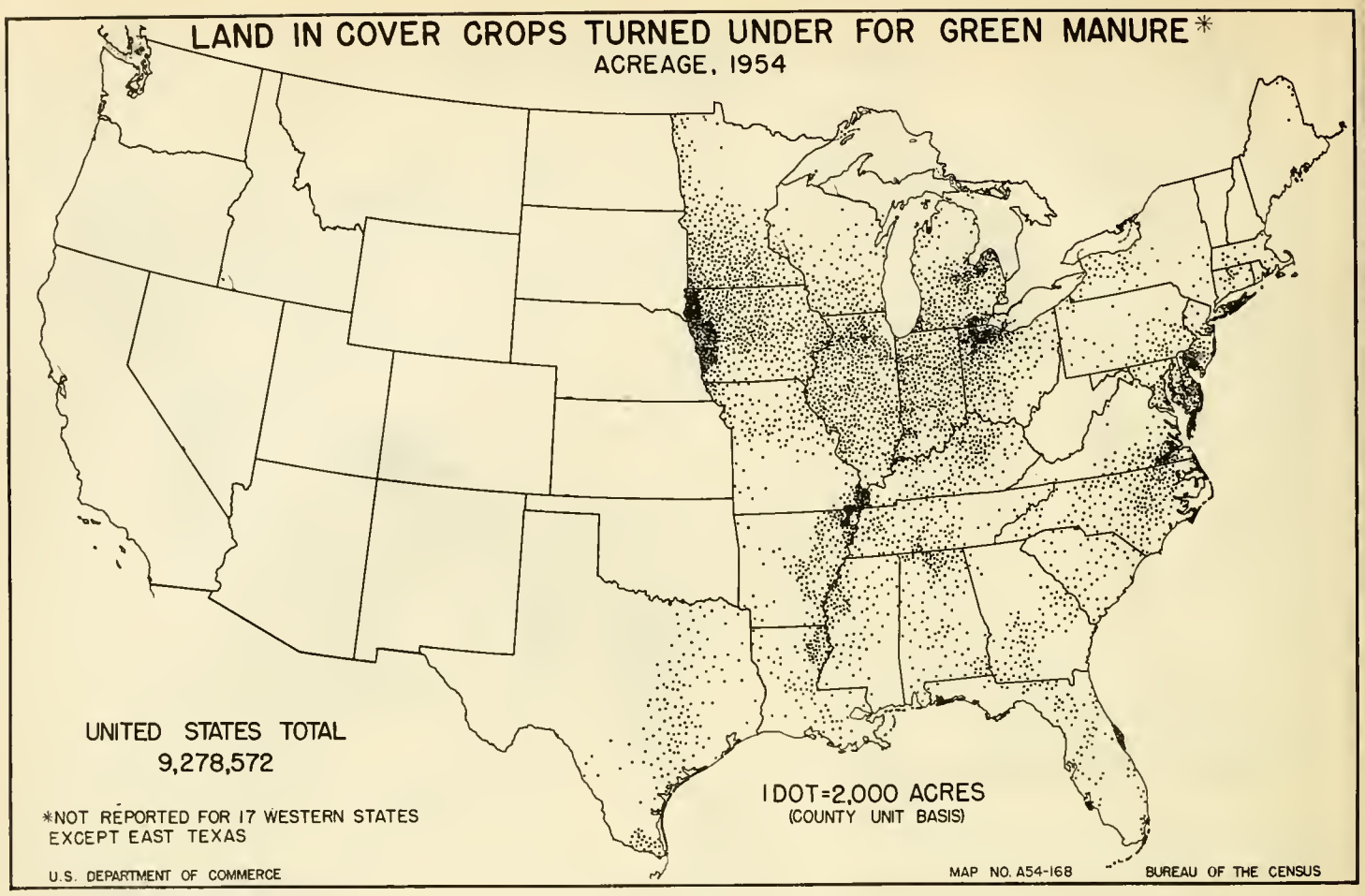


Considerable progress in the improvement of public and private grasslands has been made in recent years. More farmers are recognizing the importance of having good improved pastures on their farms if they are to make the most efficient use of their land resources. Several different practices are associated with the improvement of pastureland. Application of lime, phosphate, and potash may be required. Weeds need to be mowed and competitive plants controlled. Seeding or reseeding of pastures with good seed and with the right kind or mixture of pasture plants for the soil, slope, temperature, and moisture conditions involved is also a major prerequisite to the establishment of an improved high-forage yielding pasture.

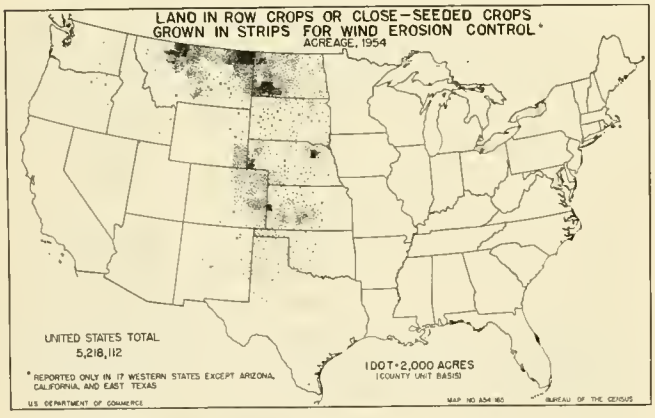
The Federal Government has taken an active part in helping farmers to improve their pastures. Research has been carried out to develop the best plants and improvement practices. Technical assistance in carrying out pasture-improvement practices is rendered by the Soil Conservation Service and financial assistance under the Agricultural Conservation Program benefits farmers in this phase of conservation.

Seeding and reseeding of pasture, 1936–53.—Seeding and reseeding of pasture has been carried out under the Agricultural Conservation Program since 1936. The accompanying chart indicates that the acreage of pasture being seeded or reseeded with financial assistance from the Agricultural Conservation Program Service has gradually been increased.

Seeding and reseeding of pasture 1950–53.—The distribution of the acreage seeded or reseeded under the Agricultural Conservation Program during a 4-year period, 1950–53, is shown by the accompanying map. The greatest emphasis on seeding and reseeding of pasture under this program is in the Southern States where cropland diverted from other uses and land recently cleared is being seeded to improved pastures. Some States, particularly Kentucky, have placed a strong emphasis on this practice in assigning funds available for payments to farmers. In other States, such as West Virginia and the New England States, more emphasis has been placed on using funds for the application of such materials as lime, phosphate, and potash. This means that the amount of seeding and reseeding of pastures in these States is not adequately reflected in the above map, which is based only on the acreage seeded or reseeded with financial assistance given for that specific practice.



SOIL-CONSERVING PRACTICES

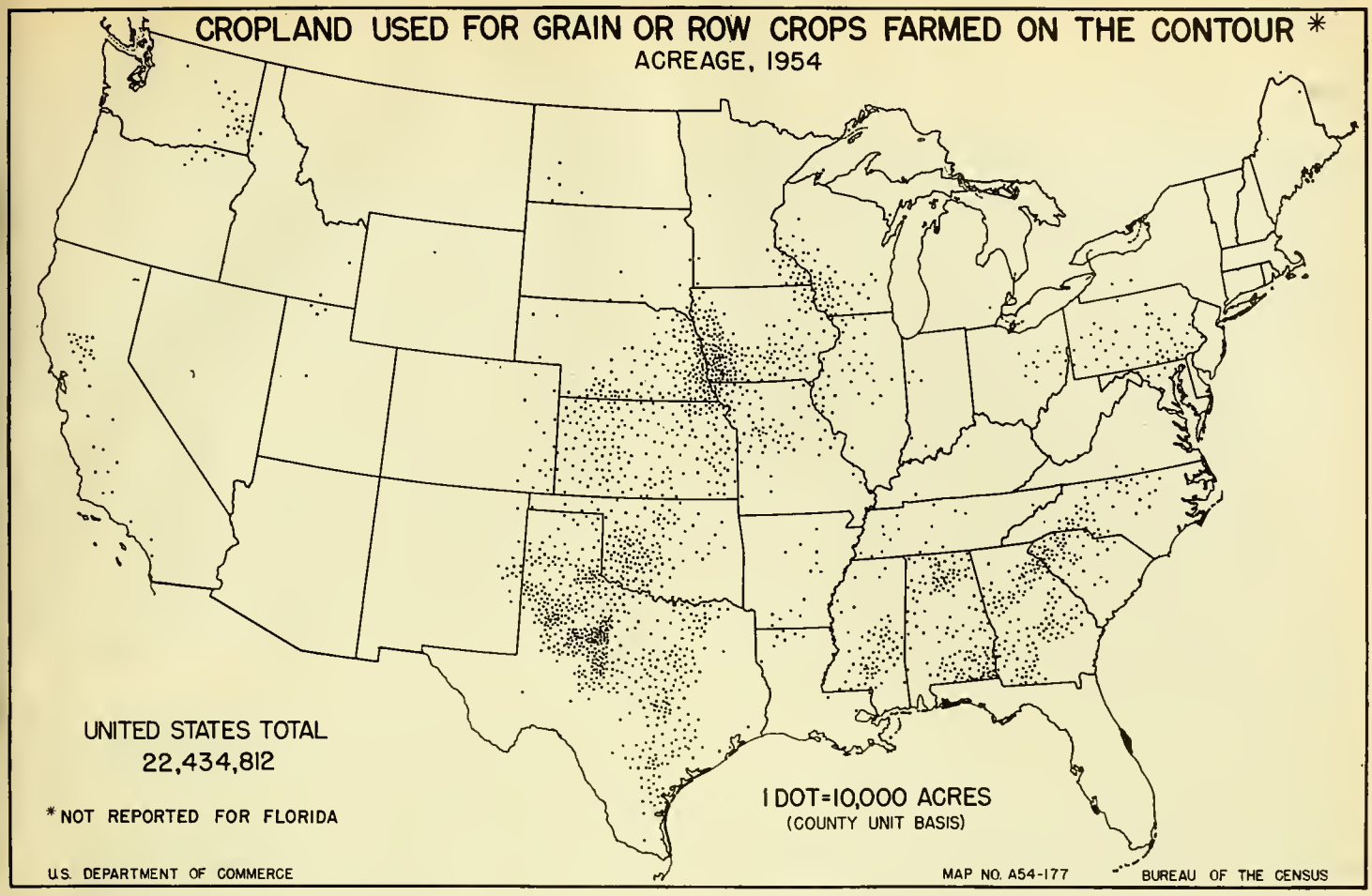


For the first time, the Census of Agriculture obtained information in 1954 pertaining to the conservation of land resources. Since the passage of the first National Soil Conservation Act by Congress in 1935, greatly increased attention has been focused on the conservation of land resources throughout the United States. In 1937, States began to pass laws which permitted farmers and ranchers to organize soil-conservation districts for the purpose of carrying out needed soil-conservation measures. The United States Soil Conservation Service has worked in close cooperation with these districts.

All States had laws by 1948 which made it possible to organize soil-conservation districts. By the end of 1955, the number of soil-conservation districts totaled 2,677. Most of these districts are about the size of a county, and many of them have boundaries that coincide with county boundaries. By the end of 1955, basic conservation plans had been prepared for more than a million farms and ranches in these soil-conservation districts. The land area of these farms and ranches for which basic conservation plans have been prepared totaled more than 298 million acres at the end of 1955.

Conservation practices have not yet been established on much of the land for which plans have been prepared because of the short time that has elapsed since the plans were completed. However, much work is in progress, and each year several million acres are receiving the benefit of soil and water conservation practices. The job ahead still remains a big one. Even when all farms and ranches have completed conservation plans, the job of carrying out these plans on a permanent basis lies ahead.

Land in cover crops turned under for green manure.—A cover crop is grown in a thick stand as a means of enriching and protecting soil resources. Some cover crops are plowed under while still green which provides green manure. Organic matter and plant food are added in this way. Some cover crops are perennials; and since they occupy the land for a period of years are thought of as a permanent cover crop. Annual crops grown for their cover value are generally planted either in the fall or in spring and early summer.



Crops planted in the fall are known as winter cover crops. Winter protection of the soil is especially significant in much of the South where clean-cultivated crops, such as cotton, corn, and tobacco, are grown and where relatively high rainfall and the absence of frozen ground are conducive to severe erosion of sloping land left without cover during the winter. Some of the winter cover crops grown in this part of the United States are vetches, Austrian winter field peas, clovers, and abruzzi rye. Sweetclover grown in the northern Corn Belt and crimson clover in the Atlantic Coastal Plain from New Jersey to Georgia are other legumes used as cover crops. Rye, winter oats, and wheat are other nonlegume crops frequently used for their value for cover and green manure. Rye is the most commonly used grass or grain crop for winter cover in the Corn Belt and Cotton Belt.

The accompanying map showing the distribution of land in cover crops turned under for green manure shows that such crops are grown widely in the Southern States, Corn Belt, southern parts of the Lake States, and in the Middle Atlantic Coastal Plain. Except for parts of Idaho, Washington, Oregon, and California, cover crops turned under for green manure is not a common practice in the 17 Western States, excluding eastern Texas. Inadequate moisture is a major reason for the infrequent use of cover crops in the 17 Western States.

Land in row crops or close-seeded crops grown in strips for wind erosion control.—As indicated by the accompanying map, this conservation practice is concentrated chiefly in the western part of the Great Plains wheat-producing areas. Along this dry margin, wheat is being grown on land that is subject to wind erosion, particularly during the drier years. Wind stripcropping, stubble mulching, and other conservation practices help to control soil blowing. The practice of wind stripcropping involves the planting of crops in strips of uniform width which are arranged at right angles to the direction of the prevailing wind. Cultivated summer fallow and small grain crops often occupy alternating strips. Not all land on which wind stripcropping is a current practice is necessarily best suited to wheat. Some of the land on which wheat is presently produced is best adapted to a permanent cover of grass used for grazing livestock.

Cropland used for grain or row crops farmed on the contour.—Crops are planted on the contour when the rows or strips are laid out at right angles to the natural slope of the land. Farming land on the contour generally means that alternating strips or bands of different crops are also used in order to retard soil and water loss. Row crops alternated with close sown crops is a general arrangement. The different crops commonly grown are also rotated among the different strips of land.

Farming on the contour is a widespread practice where sloping land is used for cropland. As shown by the accompanying map, there is widespread use of contour farming in those areas in the South where cotton is an important crop on sloping land. In some of the more rolling parts of the Corn Belt, a considerable acreage of crops are grown on the contour. In the central and southern Great Plains, growing crops on the contour is a widely used practice. Moisture conservation as well as the control of wind and water erosion is a major incentive to arranging crops on the contour. Yields are increased materially through the application of this moisture-conserving practice. In some parts of the Great Plains, where there is no dominant prevailing wind direction, strips of crops planted on the contour are likely to give more protection against wind erosion than strips planted at right angles to the prevailing wind.

FARM RESOURCES AND PRODUCTION

Remarkable growth in the use of capital in American agriculture has been a dominant characteristic of the changes taking place. This has been especially true in the last 15 to 20 years. Productive farm resources available to each of the 8.5 million farm operators, hired hands, and family workers averaged about $14,400 in 1955. In 1940, the comparable value was $3,500, which after allowance for changes in the price level means approximately a 75 percent increase in capital per worker. For full-time commercial farms, the average investment per worker would be $20,000 or more.

These productive resources are made up of land, service buildings, livestock and feed inventories, machinery and equipment, and cash-on-hand used for operating expenses such as the purchase of fertilizer, lime, seed, pesticides, gasoline, oil, livestock feed, repairs for machinery, and other related materials. Other assets owned by farmers which are not among these productive assets are dwellings, household goods, financial savings, and automobiles. The total investment in these additional assets is in the neighborhood of $5,000 per worker.

In 1955, the total farm output was nearly 50 percent more than that of 1935–39. This production came from about the same acreage of farmland, and it was produced with 30 percent less labor. However, the amount of investment capital and cash needed for operating expenses increased sharply. Using current dollars in comparing the 1935–39 period with 1955, the amount of investment capital used increased threefold and the cash outlay for nonfarm goods used in farm production was four times as great.

The percentage distribution of the value of inputs on commercial farms in 1949 indicates the relative importance of farm resources used in obtaining the present high level of farm production sold or used in farm households. Purchase of livestock and poultry; feed for livestock and poultry; seeds, bulbs, plants, and trees; fertilizer and lime, and gasoline and other petroleum fuel and oil constituted 31 percent of the total value of inputs on commercial farms. For tractor and other farm machinery repairs and for machine hire about 6 percent of the inputs were needed. Depreciation on machinery and equipment and buildings accounted for 9 percent of the total inputs. Interest on investment in land, buildings, machinery and equipment, and livestock made up 21 percent. The labor input totaled 33 percent.

Changes in agricultural production.—The transformation of production in American agriculture has been nearly complete during the last 50 years. While this transformation started prior to World War I, the outstanding changes have taken place since 1920. During and following World War II the rate of change was greatly accelerated. Production per acre and per animal, as well as the total farm output, has shown pronounced increases. Several factors have contributed to these upward changes in production.

(1) **Mechanization.**—The substitution of mechanical power and associated machinery for animal power released about 80 million acres of cropland between 1920 and 1955. This release of cropland and other resources accounted for about half of the total increase in farm output during the interwar years. Since 1940, the acreage released by this substitution of inanimate for animate power has amounted to 33 million acres, which have accounted for about a fourth of the increase in farm output during this period.

(2) **Soil conservation and improvement.**—The use of lime and fertilizer has expanded greatly in recent years. Four times as much fertilizer is used on farms today compared with the amount used in the years prior to World War II. Introduction of better conservation practices to more farms is also contributing to the increase in farm output. Planting crops on the contour, stripcropping, terracing, better crop rotations, and other soil-conserving practices have also played a part in raising farm output. Altogether, these improvements including the increased application of fertilizer have accounted for about a fourth of the increase in farm output since 1940–41.

(3) **Improvement in crops.**—The most frequently cited example of increase in ouput attributable to crop improvement has been the introduction of hybrid seed corn. Its use has spread to all of the major corn-producing areas and adoption of this improvement is nearly completed. Other improvements in crop varieties have also had their influence on yields. Use of new chemical and mechanical methods to control weeds, insect pests, and plant diseases have led to increases in yields. About a fifth of the total increase in farm output since 1940–41 can be assigned to improvements in crops.

(4) **Improvements in livestock breeding, feeding, and disease control.**—Artificial insemination and cross breeding have been important factors leading to the genetic improvement of animals. Improvement in feeding methods, including a better balanced and more adequate ration and the use of antibiotics and hormones, have gone hand in hand with breeding improvements to bring about significant increases in animal production.

(5) **Farmstead improvements.**—The greatly increased use of electricity in recent years has reduced labor requirements around the farmstead. Pumping water, milking cows, cooling milk, and numerous other chores are rendered comparatively easy tasks through the use of electricity. Many other improvements around the farmstead such as the design, construction, and location of farm buildings have led to a large saving in labor on farms where such improvements have been introduced.

When these various technological advances and improvements are brought together, there are additional increases in farm output which are attributable to the combined use of the improvements.

Agricultural losses.—In spite of these many improvements that have led to the marked increases in the farm output, there is still room for further improvement. A summary of annual losses from 1942 to 1951, made by the Agricultural Research Service, reveals that these losses amount to nearly a third of the potential value of our crops, livestock, and forest products.

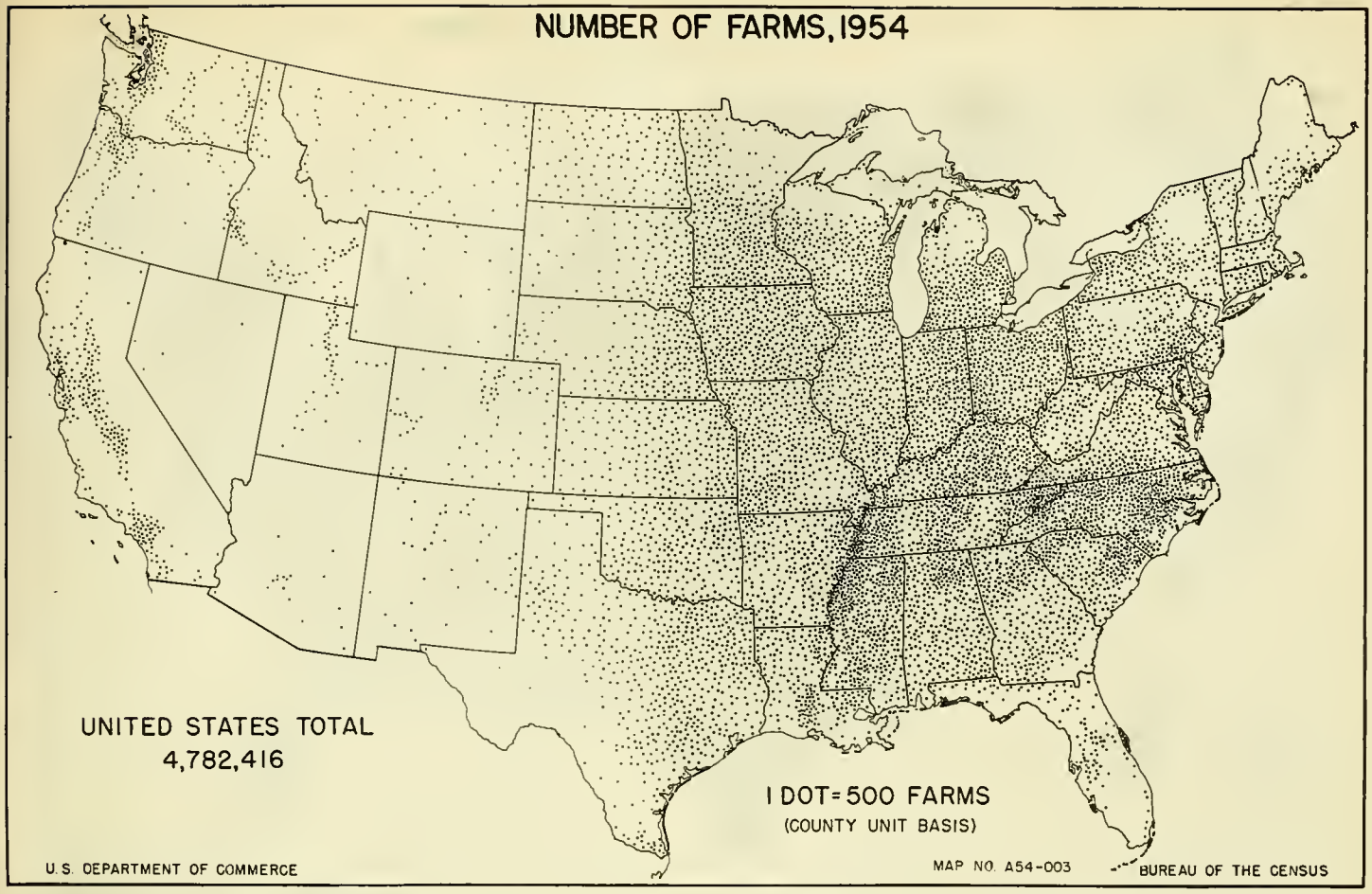
In the production of crops, weather, insects, diseases, mechanical damage, weeds, and harvesting waste contribute to a loss in output. After the crops are harvested, other losses in storage, marketing and processing; disease and death of animals to which crops are fed; destruction of nutrients in cooking; and waste of edible portions of food in the kitchen add up to a sizable amount. It has been estimated that such losses were equal to the production from 120 million acres of cropland each year between 1942 and 1951.

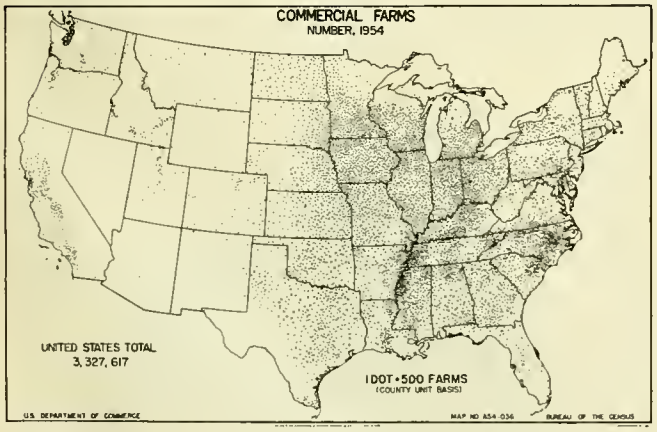
Losses in production also occur in the use of our pasture and range. These include plant diseases, fire, grasshoppers, and weeds. Such losses equal the potential production from about 154 million acres of pasture and grazing land. (Pasture and grazing land totaled a billion acres in 1954.)

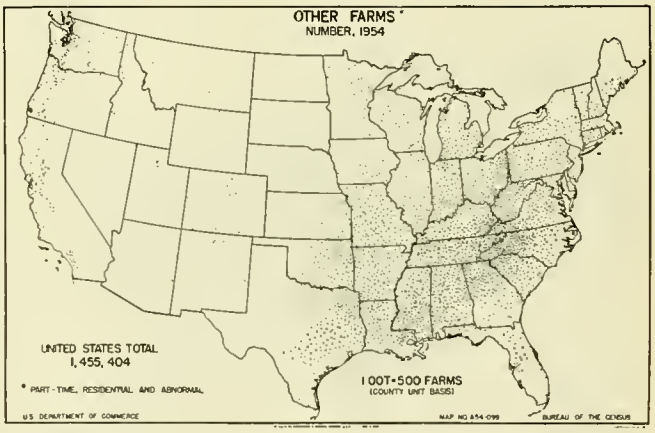
Forests are also affected by such losses as fire, diseases, insects, and wind. Such losses are estimated as equal to the potential annual growth from 228 million acres of forest land.

Not all of these losses are preventable. It is doubtful whether we will be able in the foreseeable future to eliminate many of the losses due to adverse weather, although it may be possible to reduce them. Knowledge of how to control or eliminate other losses may be available, but it may not be economically feasible to apply such knowledge. Still other losses are not preventable with present technological knowledge. However, much reduction in agricultural losses can be attained with present technical knowledge and under current economic conditions. Further research will be needed to eliminate or reduce other losses.

In this section of the graphic summary, maps and charts are presented to illustrate the use and distribution of farm resources in the production of the principal crop and livestock products. The principal features of the farm production picture are presented. Other aspects necessarily have not been included in this summary report. They are covered more completely in other reports being issued in conjunction with the 1954 Census of Agriculture.







FARMS AND FARMLAND

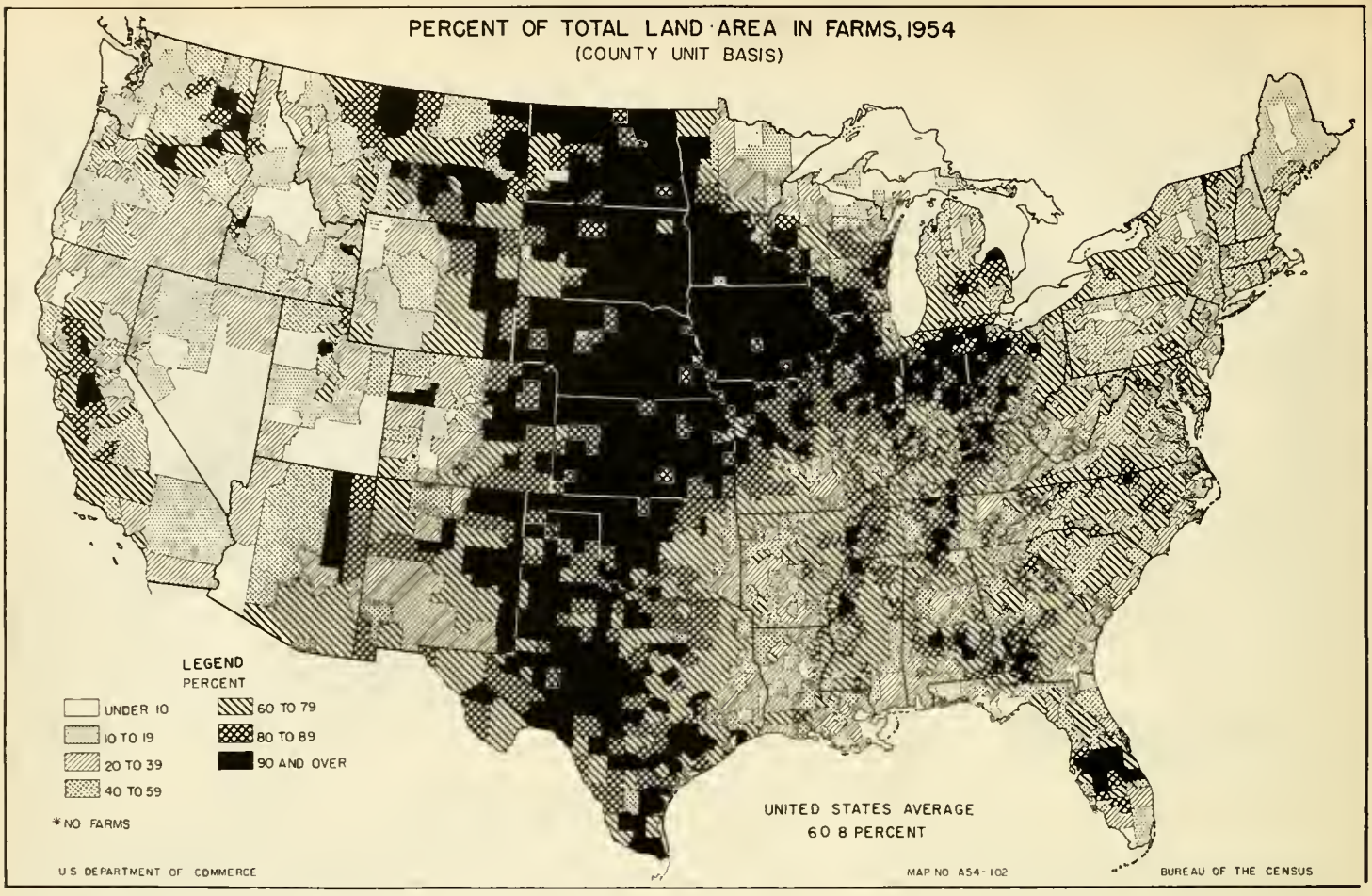
Number of farms.—In 1954, there were 4,782,416 farms reported by the Census of Agriculture. The highest densities of farms per square mile are found in parts of the South.

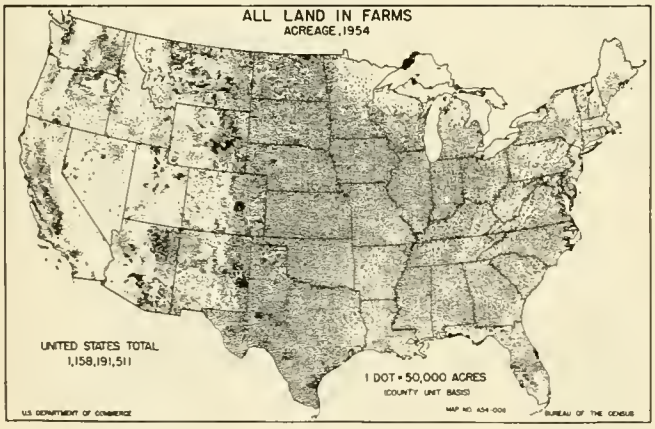
Very low densities are found principally in the areas of eastern United States where much land has never been used for agriculture and in the Western States where a large acreage per farm or ranch is needed for the raising of livestock and in dry farming operations.

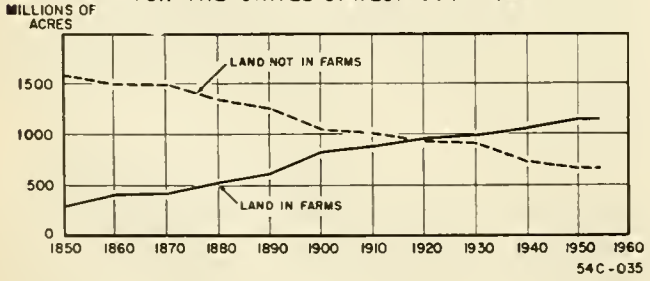
Commercial farms.—A commercial farm is any farm on which the value of farm products sold is $250 or more provided the farm operator works off the farm less than 100 days, or provided the income the farm operator and members of his family receive from nonfarm sources is less than the value of all farm products sold.

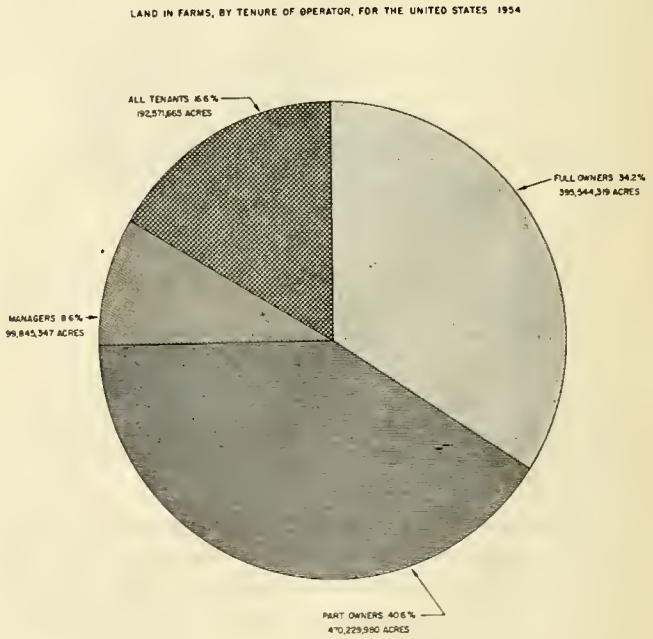
The number of commercial farms declined by 378,795 farms between 1950 and 1954. The number of large commercial farms increased but a pronounced drop in small commercial farms occurred. The relationship between the number of commercial farms and all farms remained practically the same between 1950 and 1954.

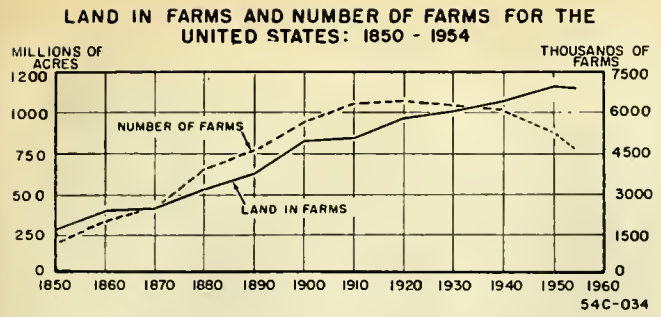
Other farms.—The three classes of other farms are part-time, residential, and abnormal. Two-fifths of the 1,455,404 other farms reported in 1954 were classified as part-time farms. On these farms, the value of farm products sold ranged from $250 to $1,199 and the operator either reported 100 days or more of off-farm work or reported other income received by himself or members of his family exceeding the value of agricultural products sold. Residential farms, which had less than $250 worth of farm products sold, accounted for practically all of the remaining other farms.


PERCENT OF TOTAL LAND AREA IN FARMS, 1954
(COUNTY UNIT BASIS)
LEGEND
PERCENT
UNDER 10
10 TO 19
20 TO 39
40 TO 59
60 TO 79
80 TO 89
90 AND OVER
*NO FARMS
UNITED STATES AVERAGE
60 8 PERCENT
U S DEPARTMENT OF COMMERCE
MAP NO A54-102
BUREAU OF THE CENSUS


ALL LAND IN FARMS
ACREAGE, 1954
UNITED STATES TOTAL
1,158,191,511
1 DOT = 50,000 ACRES
(COUNTY UNIT BASIS)


ACREAGE OF LAND IN FARMS AND NOT IN FARMS,
FOR THE UNITED STATES: 1850-1954
MILLIONS OF ACRES
LAND NOT IN FARMS
LAND IN FARMS
1500
1000
500
0
1850
1860
1870
1880
1890
1900
1910
1920
1930
1940
1950
1960
54C-035


LAND IN FARMS, BY TENURE OF OPERATOR, FOR THE UNITED STATES 1954
ALL TENANTS 15.6%
192,571,665 ACRES
FULL OWNERS 34.2%
395,544,319 ACRES
MANAGERS 8.6%
99,845,347 ACRES
PART OWNERS 40.6%
470,229,980 ACRES



All land in farms.—The total acreage of land in farms reported in 1954 was nearly the same as that reported by the 1950 Census of Agriculture, but significant regional changes have occurred during the last 5 years. In the Northern States (including Maryland and Delaware), land in farms declined by nearly 7 million acres. Of the four farm production regions that make up the Northern States, only the Northern Plains had an increase in land in farms between 1950 and 1954.

In the Southern States, the decline in land in farms amounted to more than 6 million acres with most of the decrease taking place in the Appalachian States. A slight increase in the Southern Plains was the only regional increase among the four Southern regions.

Reversion of farmland to forest land; encroachment of urban, transportation, and other nonfarm uses of land; and discontinuation of agricultural operations on small farms in favor of industrial and other nonagricultural employment have all contributed to the decline in farmland in these regions.

Offsetting nearly all of this decrease of more than 13 million acres in the Northern and Southern States was an increase of 13 million acres in the 11 Western States, most of which occurred in the Mountain States. Inclusion of more grazing land formerly not included in farms and the irrigation of previously undeveloped land account for much of this increase in acreage of land in farms.

Especially high densities of farmland shown for some counties result from showing the total acreage of large farms in the county in which the farm headquarters is located, even though the farm acreage may extend into other counties.

Percentage of total land area in farms.—In the Great Plains, Corn Belt, and Dairy Belt, a high proportion of the counties have 90 percent or more of their total land area in farms. West of the Great Plains, inadequate rainfall and mountainous topography explain the small proportion of land area that is in farms over extensive areas. Large acreages of land have remained in public ownership in the Western States. A considerable acreage of this public land is grazed by obtaining permits from the Federal and State agencies administering the land. Land grazed under these permits rather than under a leasing arrangement is not included as land in farms. A major limitation upon the use of this western rangeland grazed under permit is the necessity of grazing much of it for only part of the year.

In some parts of the States east of the Great Plains and Corn Belt, hilly topography, infertile soils, and poor drainage extend over sizable areas. These physical handicaps contribute to the relatively little use made of such land for farming purposes.

Land in farms, by tenure of operator.—The tenure status of land in farms is shown by the accompanying chart in terms of the four principal types of tenure as reported by the Census of Agriculture. Operators who own part of their land and rent part of it account for about two-fifths of the land in farms. Full owners have a third of the land in farms in their units. About a sixth of the land in farms is rented out to tenants who rent all of the land that they operate. Less than a tenth of the land in farms is operated by managers.

The most significant change in tenure status of land in farms since 1950 is the increase in the proportion of land in farms operated by part owners. All other tenure types have some decrease in the proportion of land in farms that was operated under these types.

Land in farms and number of farms.—While the acreage of land in farms remained nearly the same between 1950 and 1954, the number of farms reported by the 1954 Census of Agriculture was about 11 percent fewer than the number reported in 1950. This decrease represents extension of the nearly continuous decline that started in 1920. Only a brief period of increase (not shown by the accompanying chart, which is plotted at 10-year intervals) occurred between 1930 and 1935 when many persons from urban areas returned to farms. Most of the recent decrease in number of farms has been in the number of small farms. Availability of urban employment has been a major factor accounting for the decline in small farm numbers in the areas where industry is well developed. Some of the operators of these small farms have moved off their farms while others have continued to use their farmhouses as residences but have discontinued agricultural operations. In the South, the combination of small farms operated by share tenants and croppers into larger operating units has contributed to the decrease in farm numbers.

The increase in the number of farms of 500 acres or more reflects the increased use of machinery in agriculture. As more and more farm operators have increased the size of their farms the number of farms has necessarily declined, since the overall acreage of land in farms has not increased.

Land in farms and not in farms, 1850–1954.—Less change in the acreage of land in farms occurred between 1950 and 1954 than for any previous 5–or 10–year Census period since land in farms was first enumerated in 1850. Regional changes that occurred between 1950 and 1954 practically offset each other so that the total United States acreage declined by less than half million acres.

Most of the increase in land in farms since 1880 has occurred in the 17 Western States, except for an appreciable increase in Florida in recent years. New settlement, which continued until about 1920, accounts for part of the increase. Since 1920, about half of the total net increase has resulted from the addition of about 100 million acres of Federal, State, and Indian reservation land to the area reported as land in farms. Most of the remaining net increase of another 100 million acres occurred on privately owned land. Changes in methods of controlling grazing rights and modifications in Census definitions and procedures rather than the expansion of farming into undeveloped areas account for much of this increase on privately owned land since 1920.

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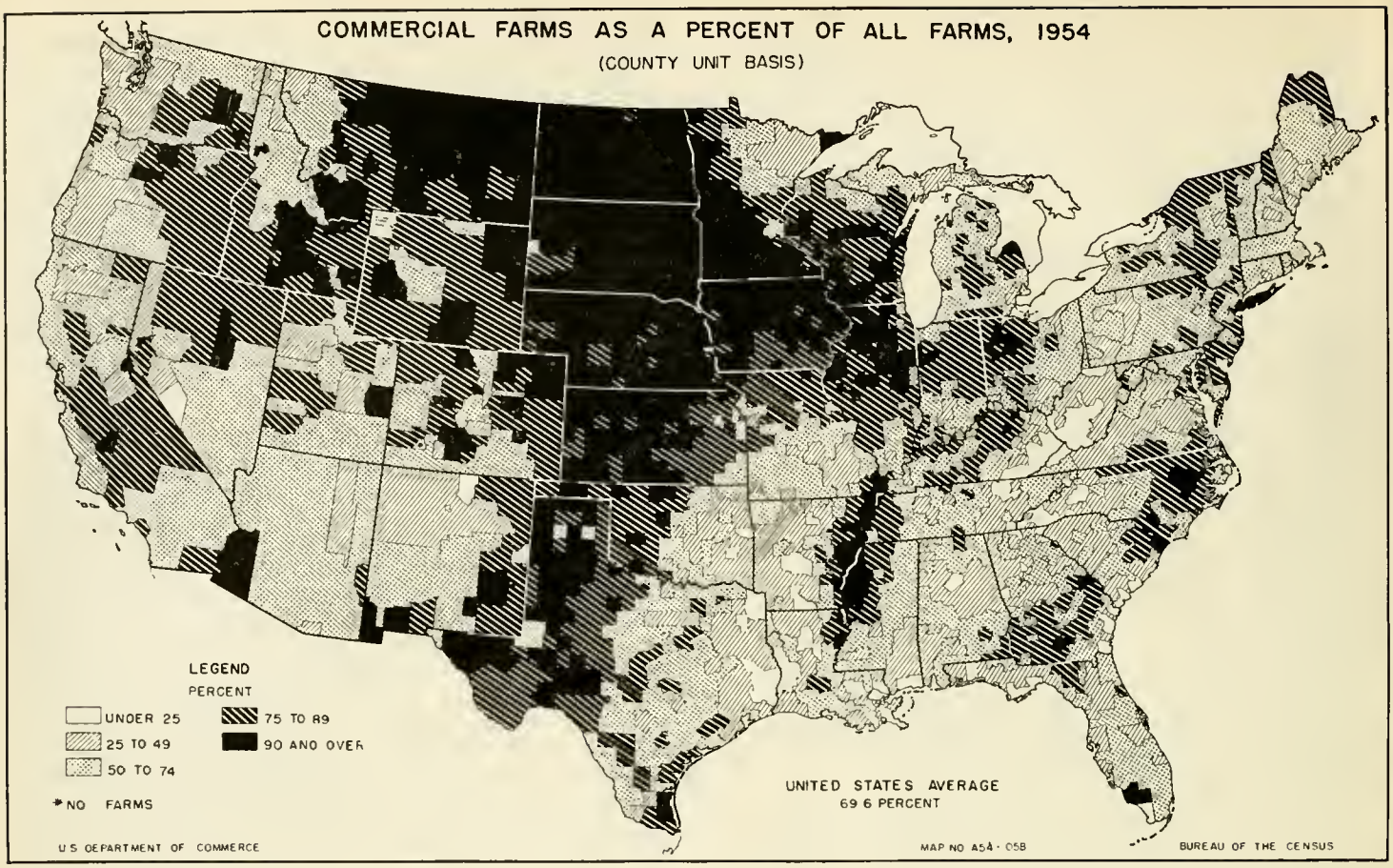
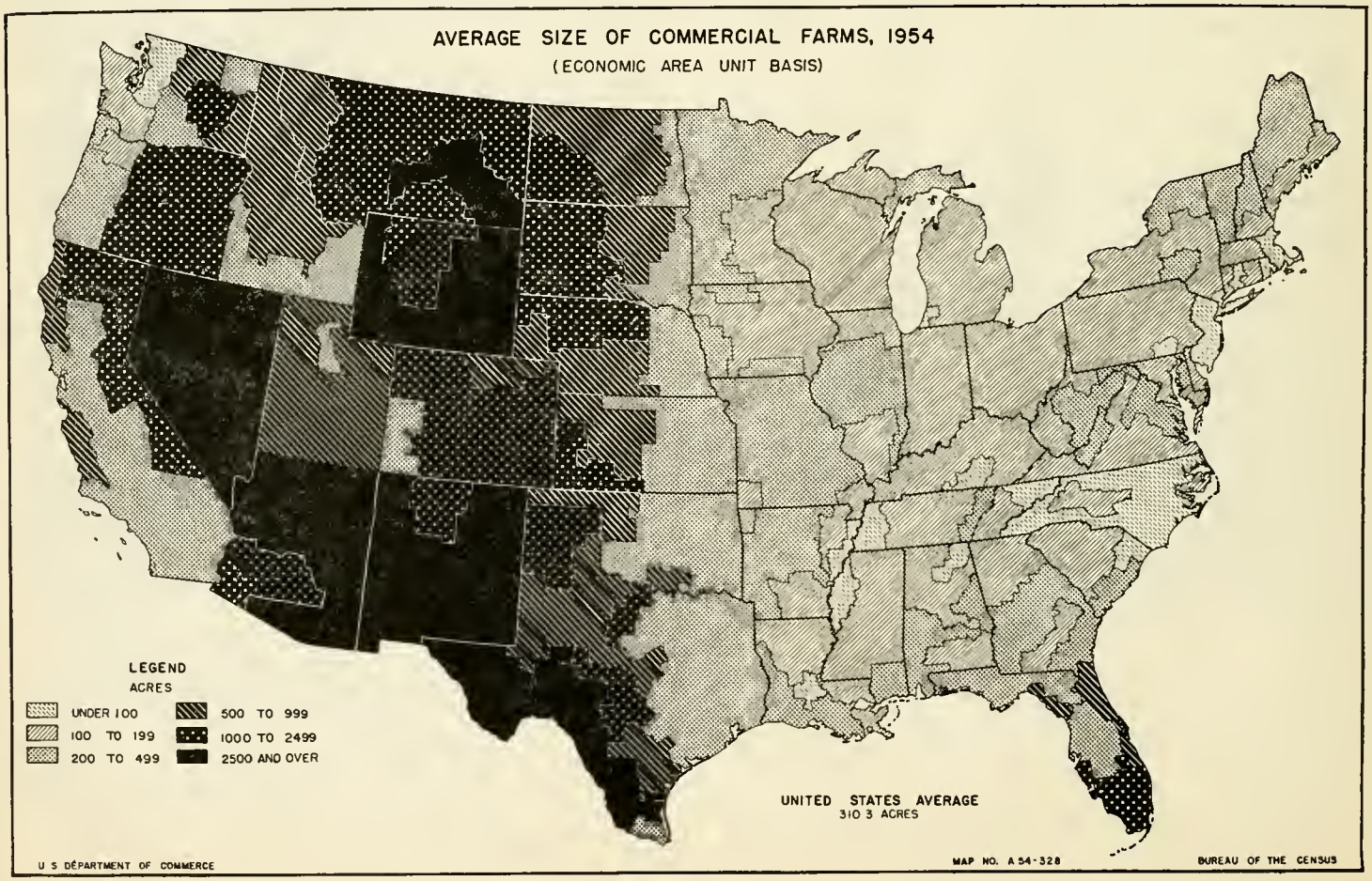

COMMERCIAL FARMS AS A PERCENT OF ALL FARMS, 1954
(COUNTY UNIT BASIS)
LEGEND
PERCENT
UNDER 25
25 TO 49
50 TO 74
75 TO 89
90 AND OVER
*NO FARMS
UNITED STATES AVERAGE
69 6 PERCENT
U S DEPARTMENT OF COMMERCE
MAP NO A54 - 058
BUREAU OF THE CENSUS


AVERAGE SIZE OF COMMERCIAL FARMS, 1954
(ECONOMIC AREA UNIT BASIS)
LEGEND
ACRES
UNDER 100
100 TO 199
200 TO 499
500 TO 999
1000 TO 2499
2500 AND OVER
UNITED STATES AVERAGE
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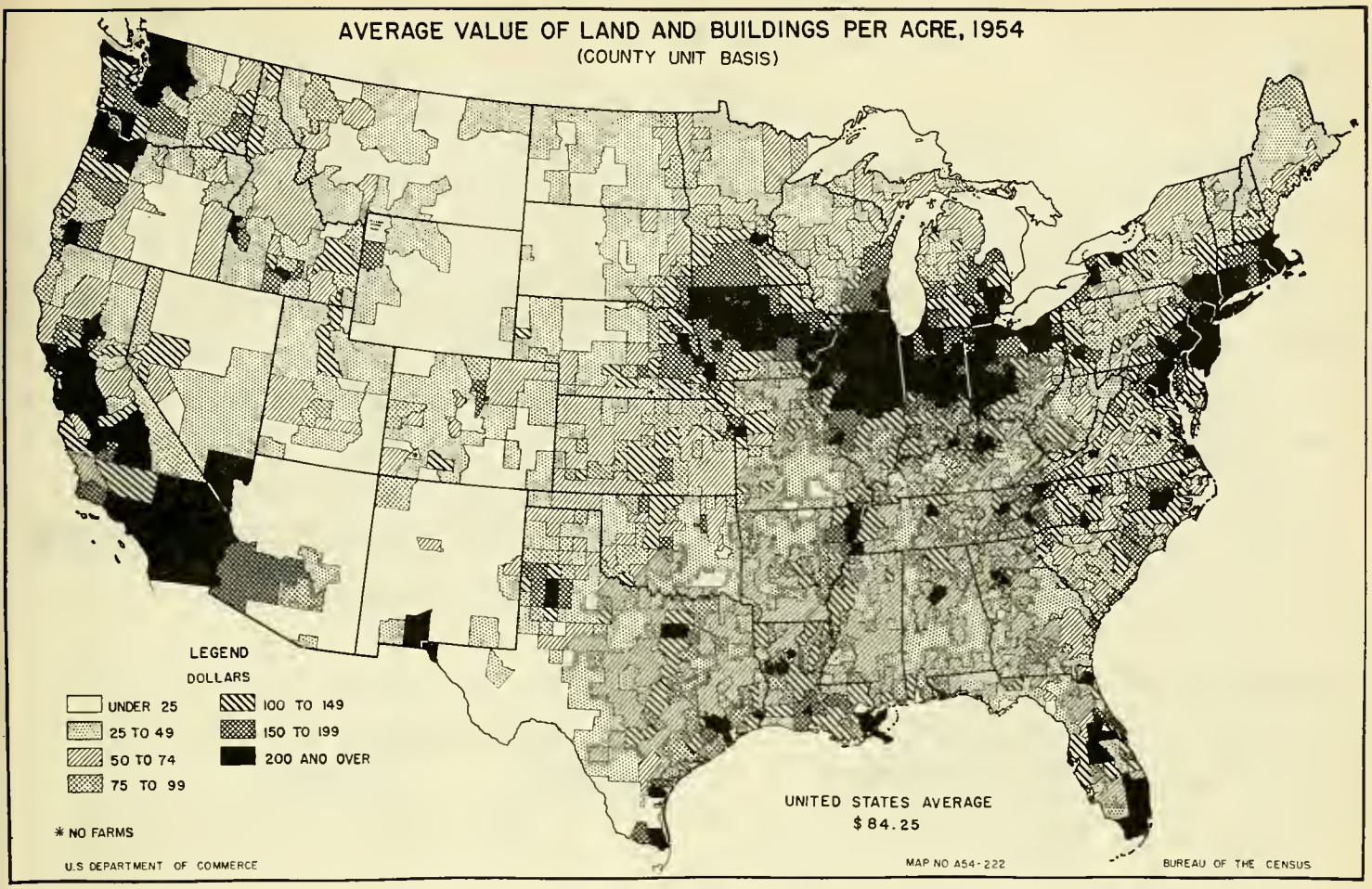
BUREAU OF THE CENSUS



Commercial farms as a percentage of all farms.—In 1954, about 70 percent of all farms were classified as commercial farms. The accompanying map shows that more than three-fourths of the farms are commercial farms in most of the Corn Belt, the Great Plains, and the northern Mountain States. The lower Mississippi Valley, parts of the Middle Atlantic and Southeastern Coastal Plain, and some areas in the Northeast also have a high proportion of commercial farms. Very few commercial farms are located in parts of several Southern States.

Average size of commercial farms.—Marked contrast in the average size of commercial farms between the Western and Eastern States is shown by the accompanying map. Only in Florida among the 31 Eastern States do commercial farms average 500 acres or more in any of the State economic areas.

The size of farm is affected by such factors as the type of agricultural operations, size of ownership units, topography, and climatic conditions. Small commercial farms averaging less than 100 acres in size for State economic areas are found principally in parts of the South where small cropper-operated farms associated with the growing of cotton and tobacco are numerous. In some areas in the Northeast where vegetable production is of particular importance, the average size of commercial farms is also less than 100 acres.

Commercial farms and ranches average 500 acres or more in size over much of the 11 Western States and the western part of the 6 Great Plains States. Land that is suitable only for grazing and has a very low carrying capacity accounts for a considerable acreage in the West. This means that a commercial farm or ranch in that region must comprise a large acreage if it is to be an economic unit. Commercial farms which are located mainly on irrigated land are not nearly so large as the ranches that depend mainly on nonirrigated grazing land.

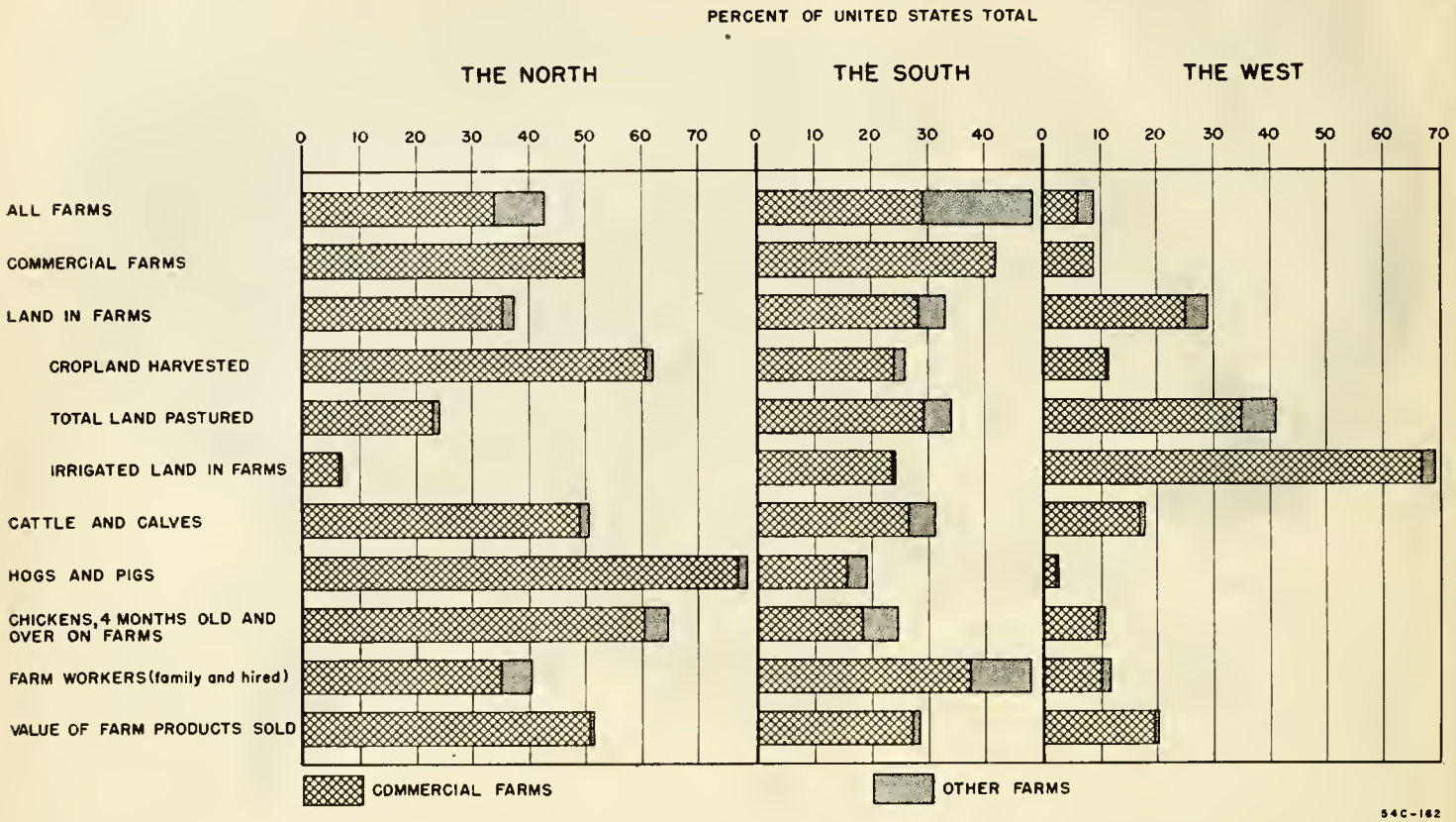
Average value of land and buildings per acre.—The 1954 Census of Agriculture shows that the value of land and buildings per acre increased 29 percent over the value reported for 1950. Values increased most sharply in Arizona and Florida with Indiana, Georgia, Maryland, Montana, and Washington also showing significant increases. Only 8 States had increases of less than 15 percent. Most of these were New England States.

The accompanying map shows the distribution of counties according to the 1954 average value of farmland and buildings per acre. The three largest concentrations of land and buildings having an average value per acre of $200 and over are in the Corn Belt, Northeastern, and Pacific States. The high values in the Northeastern States, which extend from southern New England to Washington, D. C., reflect the influence of urbanization on the value of farmland located near large centers of population. A similar influence may be observed in the Pacific States where the highest average per acre values of land and buildings are in part associated with the large metropolitan centers of Los Angeles, San Francisco, Portland, and Seattle. Increases in the value of irrigated land are also reflected in overall increases in the value of land and buildings in the Pacific States and in some other parts of the Western States.

The most extensive contiguous area with high land values per acre is in the Corn Belt States. In this area, high average values may be attributed primarily to the productive capacity of the land.

Many scattered counties with high average per acre values for land and buildings can generally be associated with urban centers or with areas having a high proportion of irrigated land in the Western States.

DISTRIBUTION OF SELECTED RESOURCES FOR THE UNITED STATES BY REGIONS AND BY COMMERCIAL AND OTHER FARMS WITHIN REGIONS: 1954



Distribution of selected resources.—The distribution of some of the principal farm resources among regions and between commercial and other farms is shown by the accompanying chart. Several marked contrasts among regions are readily observable. These regional differences are an important and interesting feature of American agriculture. As this chart is studied, it is helpful to keep in mind that the total land area of the northern and southern regions each comprises about three-tenths of the total land area of the United States while the western region accounts for two-fifths of it.

The distribution of all farms shows that the South has nearly half of the United States total while less than a tenth of the farms are located in the West. It should also be noted that other farms, which consist of part-time, residential, and abnormal farms, account for a much greater number of the farms in the South than in the other two regions. Thus, about half of the commercial farms are in the North compared with about two-fifths in the South and less than a tenth in the West.

Land in farms is more evenly distributed among the three major regions than is the number of farms. The North has 38 percent of the total, the South has 33 percent, and the West has 29 percent. This means that a greater proportion of the total land area in the North and South is in farms than in the West. While nearly a third of all farms are other farms, it should be noted that only about a tenth of the land in farms is in other farms. This means that most of these other farms, except for abnormal farms, have very limited land resources.

Cropland harvested, which constitutes the most significant part of the land resources in farms, is strikingly concentrated in the North. More than three-fifths of the total acreage of cropland harvested is in this region. About a fourth of it is in the South and slightly more than a tenth is in the West.

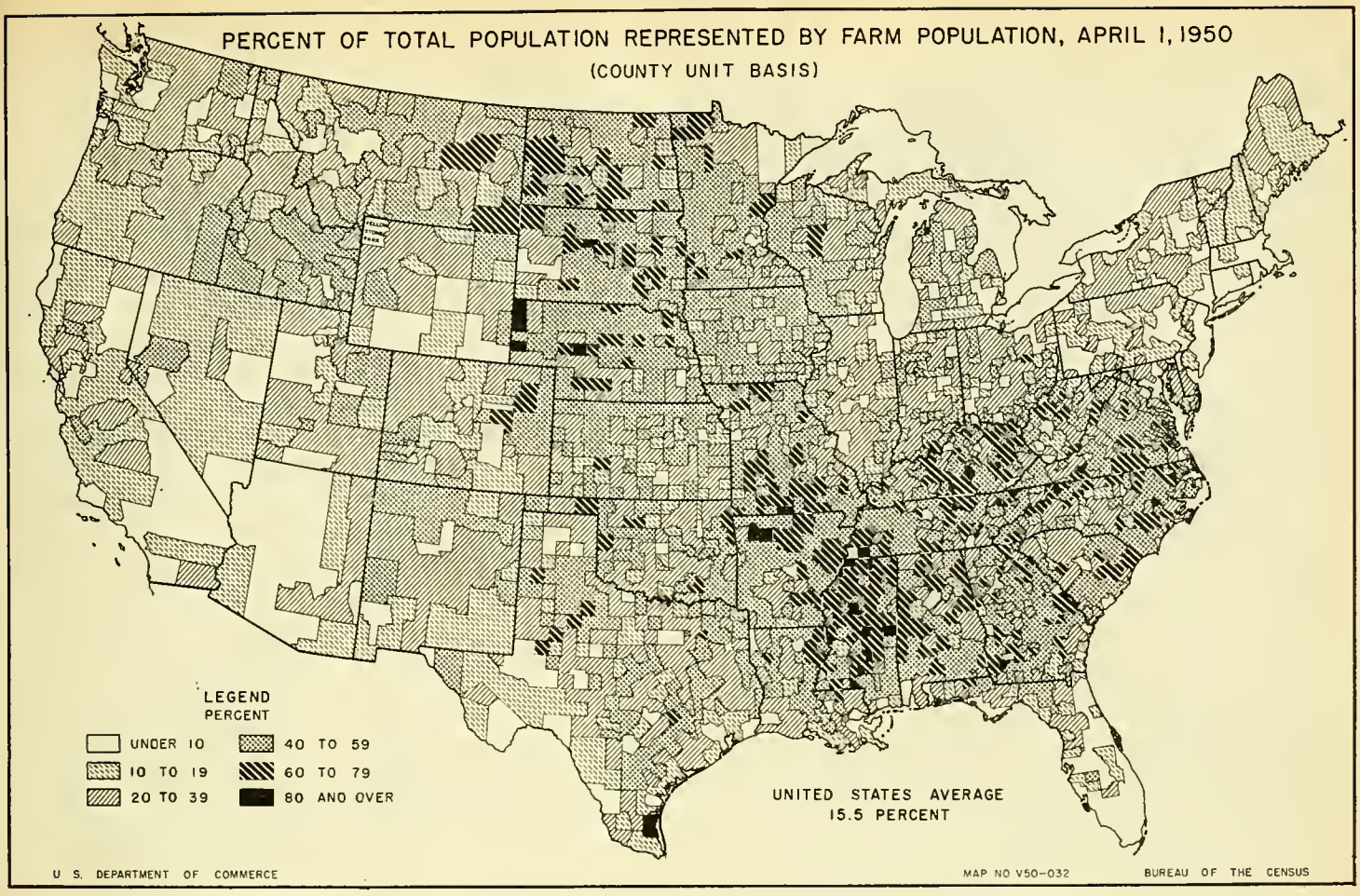
Of the total acreage of land pastured, the West accounts for two-fifths of it, the South has about a third of the total, and the North about a fourth. Considerable variation in the quality of pasture exists among these three major regions. Cropland used only for good quality pasture largely grown in rotation with crops is more heavily concentrated in the North than in the other two regions. Woodland pasture in farms is found to a greater extent in the South and West.

Although there has been a marked increase in irrigated land in farms in the North and South in recent years, the 11 Western States still have nearly 70 percent of all irrigated land.

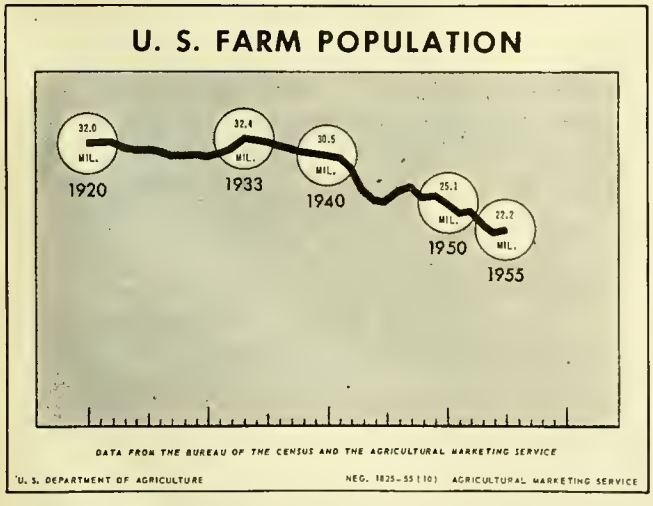
The concentration of three of the principal classes of livestock in the North is another significant fact in American agriculture. More than three-fourths of all hogs and pigs, nearly two-thirds of all chickens 4 months old and over on farms, and half of all cattle and calves are found in the North.

The number of all farmworkers both family and hired is largest in the South, which has nearly half of the total. Two-fifths of the farmworkers are on farms in the North and a tenth in the West. Workers on commercial farms are also slightly more numerous in the South than in the North.

This disparity between the distribution of human resources on American farms and the distribution of land and capital is further emphasized by the contrast in the distribution of the value of farm products sold. More than half of the total value of farm products sold comes from the North where only two-fifths of the farm workers reside. In the West, about a tenth of all farmworkers produced a fifth of the total value of farm products sold in the United States in 1954. On the other hand, the farmworkers of the South, which comprise nearly half of the United States total, produced less than three-tenths of the value of farm products sold in that year.



FARM POPULATION



The Nation's farm population continued to decline between 1950 and 1955. The decline amounted to nearly 3 million persons. During the same period total population increased from 151 million to 165 million persons. This means that the farm population comprised only 13.5 percent of the total population in 1955 compared with 16.6 percent in 1950.

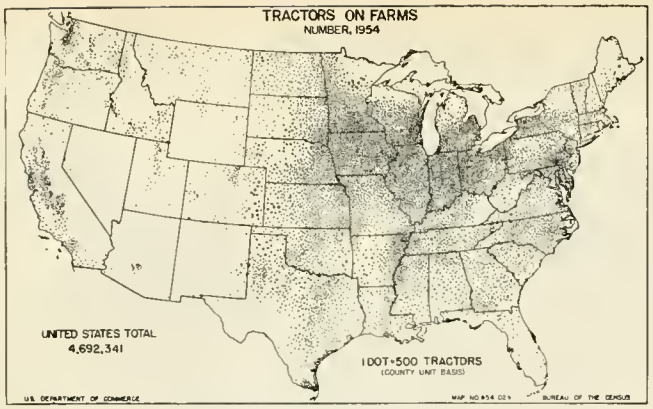
Percentage of total population represented by farm population, 1950.—Since the last complete population Census was taken in 1950, the accompanying map shows the percentage of total population represented by farm population as of 1950. The overall pattern has not changed significantly during the last 5 years. The heaviest concentration of farm population still remains in the South. The proportion is particularly high in areas where small tenant-operated cotton and tobacco farms are numerous and where there are many part-time and residential farms. Counties with a very low proportion of farm population are widely scattered. Highly urbanized counties account for many of the counties with less than 10 percent of the total population living on farms. In some counties with very few farm people, mining and forestry are more important activities than farming.

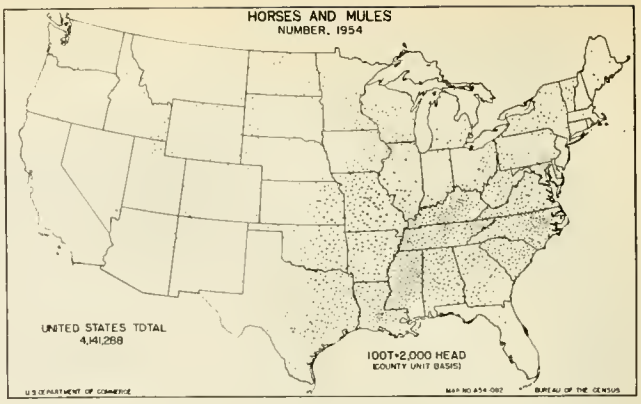
The regional distribution of farm population has changed only slightly during the last 35 years. In 1920, the regional distribution was as follows: Northeast, 8 percent; North Central, 32 percent; South, 53 percent; and West, 7 percent. In 1955, the Northeast had 9 percent of the total; the North Central, 32 percent; the South, 50 percent; and the West, 9 percent.

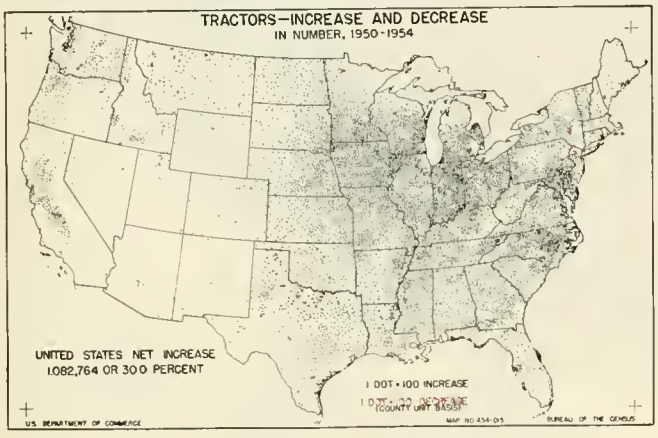
United States farm population.—The peak in farm population since 1920 was reached in 1933 when more than 32 million persons were living on farms. Since 1933, a persistent decline has occurred. A pronounced dip in the farm population curve during World War II accelerated this decline. Many who left the farm during the war did not return after its end.

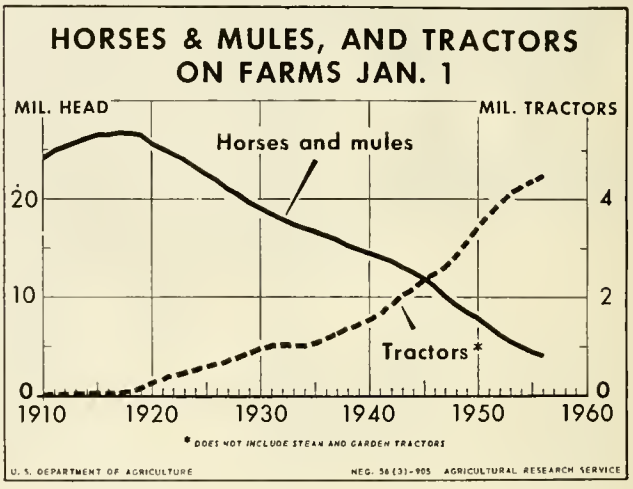
Between 1950 and 1955 all regions lost farm population. The decline was below the national average in the Northeastern, North Central, and Western States and above it in the South.

A high degree of mobility is characteristic of the farm population of the United States. More than 2 million persons have moved to and from farms in nearly every year since 1921. During most of this period, the movement away from farms has exceeded the movement to farms. Only for a short time during the depression years and immediately after World War II was this trend reversed significantly. Net migration away from farms has been highest during periods of greatest opportunity for off-farm employment. These periods have also coincided with periods when mechanization of farming was progressing rapidly.









POWER AND EQUIPMENT

The introduction of inanimate power has brounght many striking changes to American farms during the last 50 years. The tractor has supplied the major part of this power. Trucks, automobiles, and electricity are other important sources of inanimate power used on the farm. In 1910, an estimated 1,000 tractors were in use on American farms. World War I brought a shortage of labor on farms, higher prices, and an increase in cash receipts which help to explain the fact that by 1920 there were nearly a quarter of a million tractors on farms. A nearly uninterrupted increase in numbers of tractors has occurred each year since 1920. The only exception was during the depression years of the early thirties.

The use of electricity on farms has expanded rapidly during the last 30 years. Reports of the Edison Electric Institute show that in 1926 a total of 0.7 billion kilowatt-hours of electricity were used on farms. By 1954, the kilowatt-hours used had increased to 20.8 billion kilowatt-hours. An average of 4,000 kilowatt-hours of electricity was used per farm in 1954. Among the principal uses of electricity on the farm, other than for lighting and appliances in the home, are pumping water and milking cows.

These new sources of power have greatly reduced the number of horses and mules needed on farms. The number of horses and mules on farms expanded rapidly during the 19th century. The peak number was reached during World War I when nearly 27 million were estimated to be on farms. Since 1918 an uninterrupted decline in the number of horses and mules has occurred. The 1954 Census of Agriculture reported only 4.1 million horses and mules of all ages still remaining on farms.

Since the introduction of these new forms of power, fewer farmworkers are needed to produce food and fiber for domestic use and for export. In 1820, the labor force engaged in agricultural pursuits comprised nearly three-fourths of the total number of persons engaged in all occupations. By 1870, this had been reduced to about one-half, and by 1920, to approximately a fourth of the total. In 1950, the persons engaged in agriculture made up only a little more than a tenth of the persons engaged in all occupations.

This means that today 20 persons are supported by one farmworker compared with only 7 in 1910 and only 4 in 1820. Farm employment has declined from a peak total of 13.6 million workers reached during the period, 1910 to 1917, as compared with only 8.5 million workers in 1954.

In addition to these important influences upon the number of farmworkers needed and the output per farmworker, the substitution of inanimate power for horse and mule power on farms has had a major influence on the acreage of agricultural land required to supply the food and fiber needs of the Nation. This influence has already been indicated in a previous chart. However, it reemphasizes the fact that a major reason for the stability in total cropland acreage since 1920 has been the substitution of tractors for horses and mules. Cropland and pastureland formerly used to produce feed for farm and nonfarm draft animals are now available for producing food and fiber for domestic use or for export. From the peak of 93 million acres used for feeding all horses and mules in 1915, the acreage used for such purposes declined to only 10 million acres in 1955.

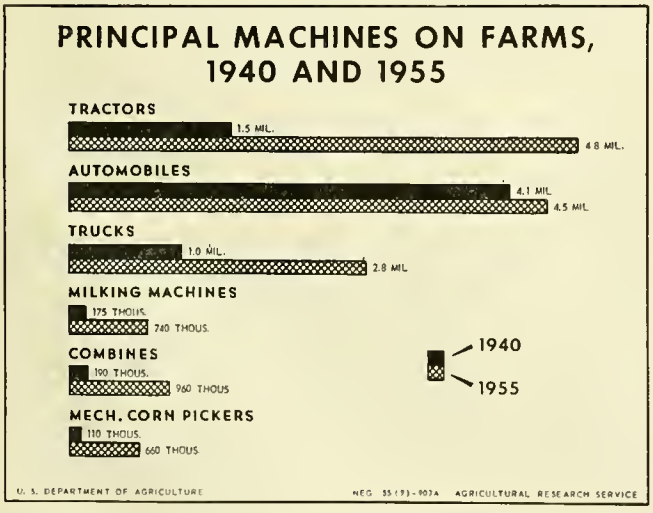
The accompanying maps and charts depict some of the major distribution and trend characteristics in the use of farm power and equipment.

Tractors on farms.—Tractors were reported on 2.9 million farms in 1954. Since the total number of tractors reported was 4.7 million, there were many farms with more than one tractor. Half of all tractors in the United States are concentrated in the 12 North Central States. The distributional pattern for tractors corresponds closely to that of cropland harvested.

Horses and mules.—Between 1945 and 1954, the number of horses and mules on farms declined from 11.6 million to 4.1 million head. As shown by the accompanying map much of the remaining horse and mule population is found in the Southern States, where tractors have not been as widely used as in the Northern and Western States.

Tractors—increase and decrease, 1950–54.—In most parts of the United States, the number of tractors has increased. On many farms in the Corn Belt the increase is associated more with the addition of a second tractor to farms rather than with the replacement of horses and mules by tractors. In the Southern States many more farms substituted tractors for horses and mules as a source of power between 1950 and 1954. The tobacco-producing areas of eastern North Carolina and South Carolina have marked increases in the number of tractors. Two other areas outside the Corn Belt and Lake States which have had especially large increases are southeastern Pennsylvania and adjacent areas in Maryland and Delaware. Some of this increase has occurred on farms where tradition and custom delayed the substitution of tractors for horses and mules. It is also an area where the use of small garden tractors has expanded on part-time farms and residential farms around cities. In the Western States, tractors have increased mainly in the irrigated areas.

Horses and mules and tractors on farms, 1910–56.—The number of tractors on farms has expanded from only a very few in 1910 to 4.5 million, not including steam and garden tractors. A sharp persistent decline in the horse and mule population has accompanied the increased use of tractor power. Horses and mules now furnish only a small part of the present farm power needed. Also significant is the fact that further reduction in the acreage of land needed to furnish feed for horses and mules will no longer be a significant factor contributing to greater production of food and fiber for domestic use and for export from the same total cropland acreage.



Principal machines on farms, 1940 and 1955.—World War II and postwar prosperity have been strong incentives to farm mechanization. The amount of farm machinery that farmers buy in most years is determined mainly by present and prospective income and by availability of the machinery. During the depression years of the early thirties purchases of machinery and equipment were low mainly because of the income factor, but during World War II, limitations on the manufacture of farm machinery meant that farmers could not buy all of the machinery that they wanted. Annual purchases of farm machinery and equipment, including motortrucks and automobiles, exceeded $3 billion a year from 1948 to 1954, which equals about a tenth of the cash receipts from farming during these years. The highest previous total expenditure for a single year was in 1947 when about $2 billion were expended for this purpose by farmers. Investment of savings accumulated during the War and early postwar years and installment buying are the major forces that explain this high level of machinery and equipment buying.

The accompanying chart presents a comparison between 1940 and 1955 for some of the principal farm machines. All machines shown in the chart, except automobiles, have had a marked increase in numbers during this 15-year period. There were nearly as many automobiles on farms in 1940 as in 1955. All other types of machinery have had high proportional increases. There were about 3 times as many tractors and trucks in 1955 as in 1940; 4 times as many milking machines; 5 times as many combines; and 6 times as many mechanical cornpickers. Numbers of other machines such as cottonpickers and pickup balers have also increased rapidly.

The use of the mechanical cottonpicker has been one of the newest and most widely discussed innovations in the farm machinery field. A comparison of the method of harvesting used in the 1947–48 harvesting season with that used in the 1954–55 season reveals the fact that most of the mechanical picking of cotton has been introduced during these years:

Method of harvesting	*Estimated percentage of crop harvested*	
	1947–48	*1954–55*
Hand-picked	77.5	54.2
Hand-snapped	20.6	24.3
Machine-picked	0.1	15.9
Machine-stripped	1.8	5.6

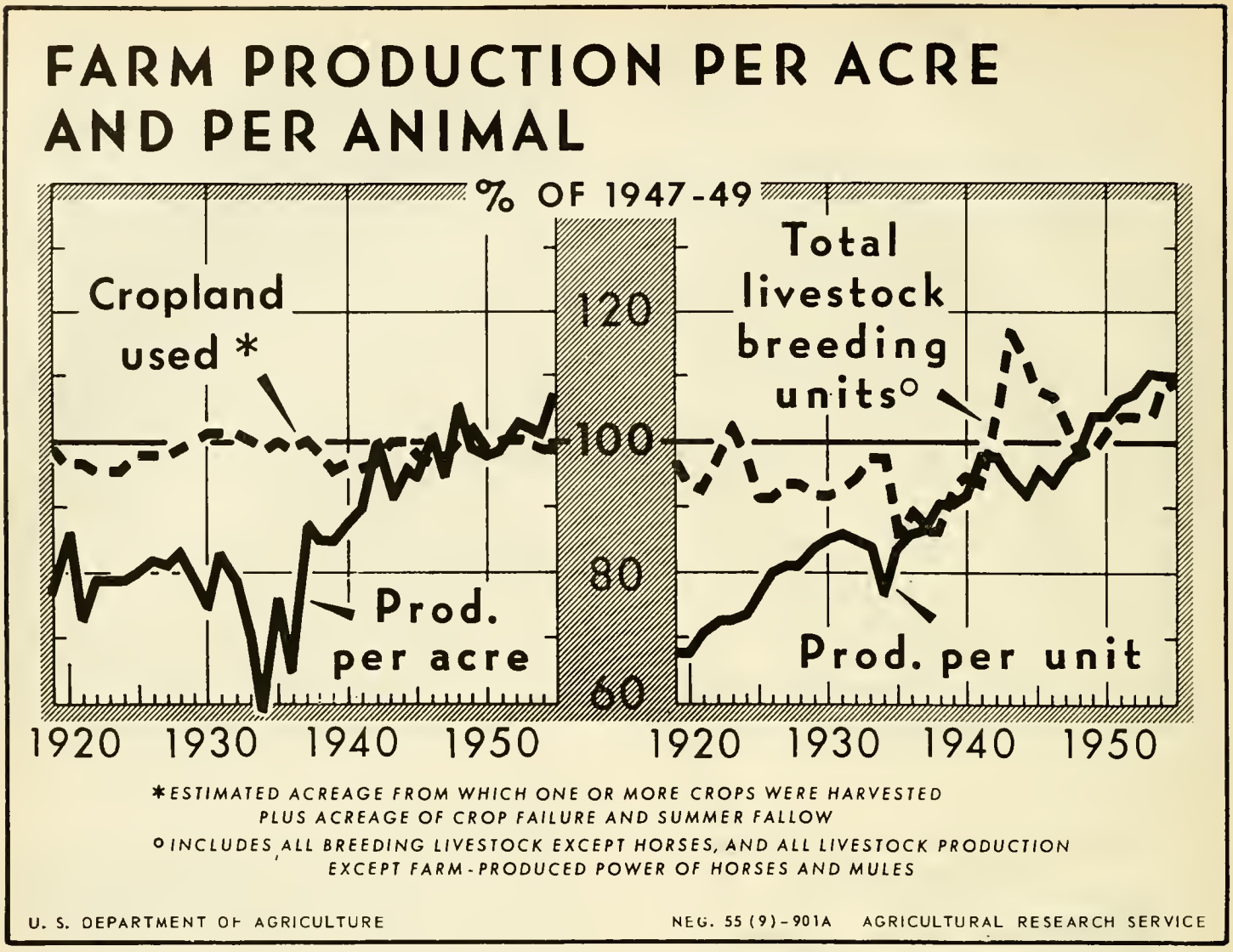
The use of the machine-picker is restricted mainly to certain parts of the cotton-producing areas. For the 1954–55 season, 62 percent of the California cotton crop was machine-picked. For Arizona, machine picking accounted for 44 percent of the crop. Louisiana ranked next with 28 percent, followed by Missouri, 22 percent; Arkansas, 16 percent; Mississippi, 11 percent; and New Mexico, 8 percent. In all other cotton-producing States less than 5 percent of the cotton was machine-picked in the 1954–55 harvesting season.

Regional differences in the use of other kinds of farm machinery also exist. These differences are explained partly by contrasts in type of farming but also by the rate at which farmers have been able to mechanize their operations. Thus for example, nine-tenths of the cornpickers are on farms located in the 12 North Central States, but these 12 States account for only seven-tenths of the Nation's corn acreage.

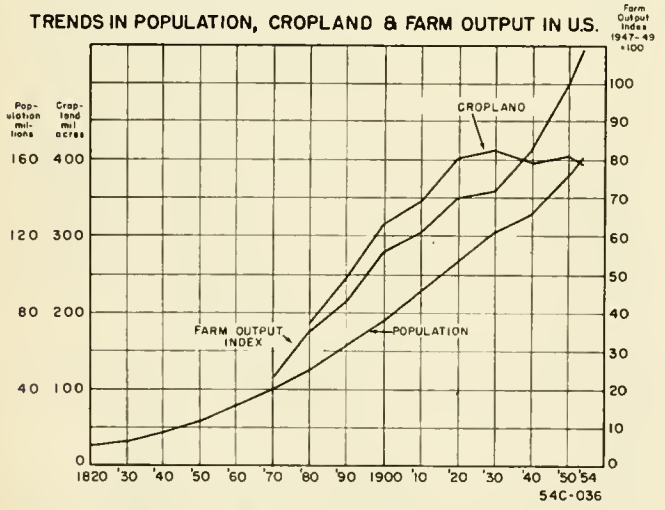
Another kind of farm machinery and equipment that is of growing importance is that used in the control of insects, plant diseases, and weeds through spraying and dusting. The introduction of new pesticides has been accompanied by improvements in the methods of application. The leading developments in spraying and dusting equipment include high-pressure sprayers for tree fruits and nuts, low-pressure or low gallonage sprayers used principally on field crops, and increased spraying and dusting from airplanes. The Production Economics Research Branch, Agricultural Research Service, has estimated that in 1952 about 31 million acres of farmland were treated one or more times for the control of weeds and brush and 29 million acres were sprayed or dusted for the control of insects and diseases.

Much of the land treated for control of weeds and brush is located in the Corn Belt, Northern Plains, Mountain, and Pacific regions. Acreage sprayed or dusted for control of insects and diseases is mainly concentrated in the Southern and Western States.

The use of machinery on American farms will undoubtedly continue to increase. Machines and equipment already in use on some farms will become more widely used. New machinery and equipment are introduced every year. Existing machines are being improved to do a better and more efficient job. These expected changes will continue to affect the use of land resources and further adjustments in the regional pattern of land use may be anticipated. These will be related in part to technological advances in mechanizing farm operations.



AGRICULTURAL PRODUCTION



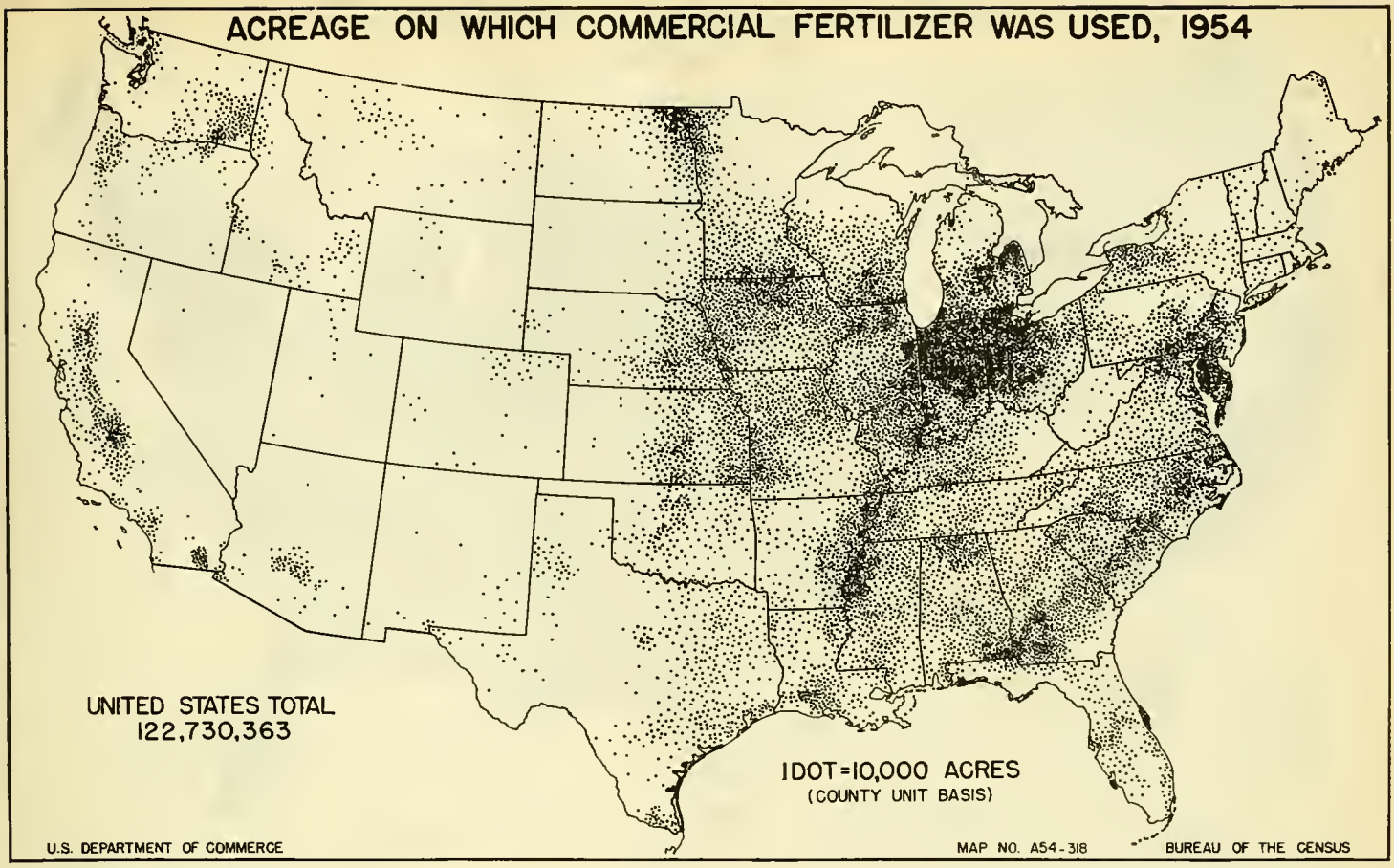
Total farm output has nearly doubled during the last half century. A record farm output in 1955 was more than a third greater than the output of 1940. Population was only a fourth greater in 1955 than in 1940. The accompanying two charts indicate some of the changes that have occurred.

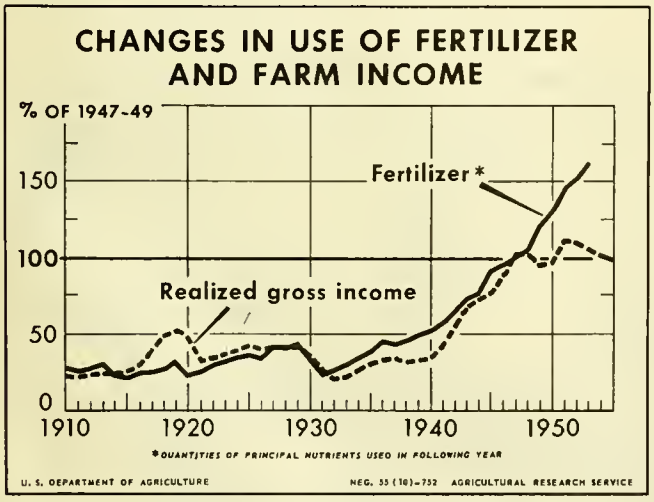
Farm production per acre and per animal.—Rising production per acre and per animal unit has characterized American farming, particularly since the mid-thirties. Drought and depression in the early thirties interrupted a general upward trend since World War I. Since 1940, production per acre has increased by a fifth and production per breeding unit by nearly a fourth. This increase in productivity since 1940 means that the current high farm output has been reached with about the same acreage of cropland, 15 percent more breeding units of livestock, and 30 percent fewer man-hours of farm labor. Substitution of resources bought off the farm for land, labor, and workstock has been a significant economic change in American farming during recent years.

High crop production per acre during recent years has been associated with increased application of fertilizer, use of hybrid corn and other improved seed and plants, better control of insects, and good weather. Greater efficiency in livestock production has come about through more and better feed per animal unit, less loss through disease, and improvement in breeding stock.

Trends in population, cropland, and farm output in United States.—Population in the United States continues to increase. Since World War II this increase has been at an accelerated rate compared with the lower rates of increase for much of the decade of the thirties. In 1950, the total United States population was 151 million. By 1954 it had reached 162 million, increasing by about 3 million persons per year.

Until about 1920 the curves that represent cropland and the farm output index on the accompanying chart closely paralleled each other. Much of the increase in farm production necessary to





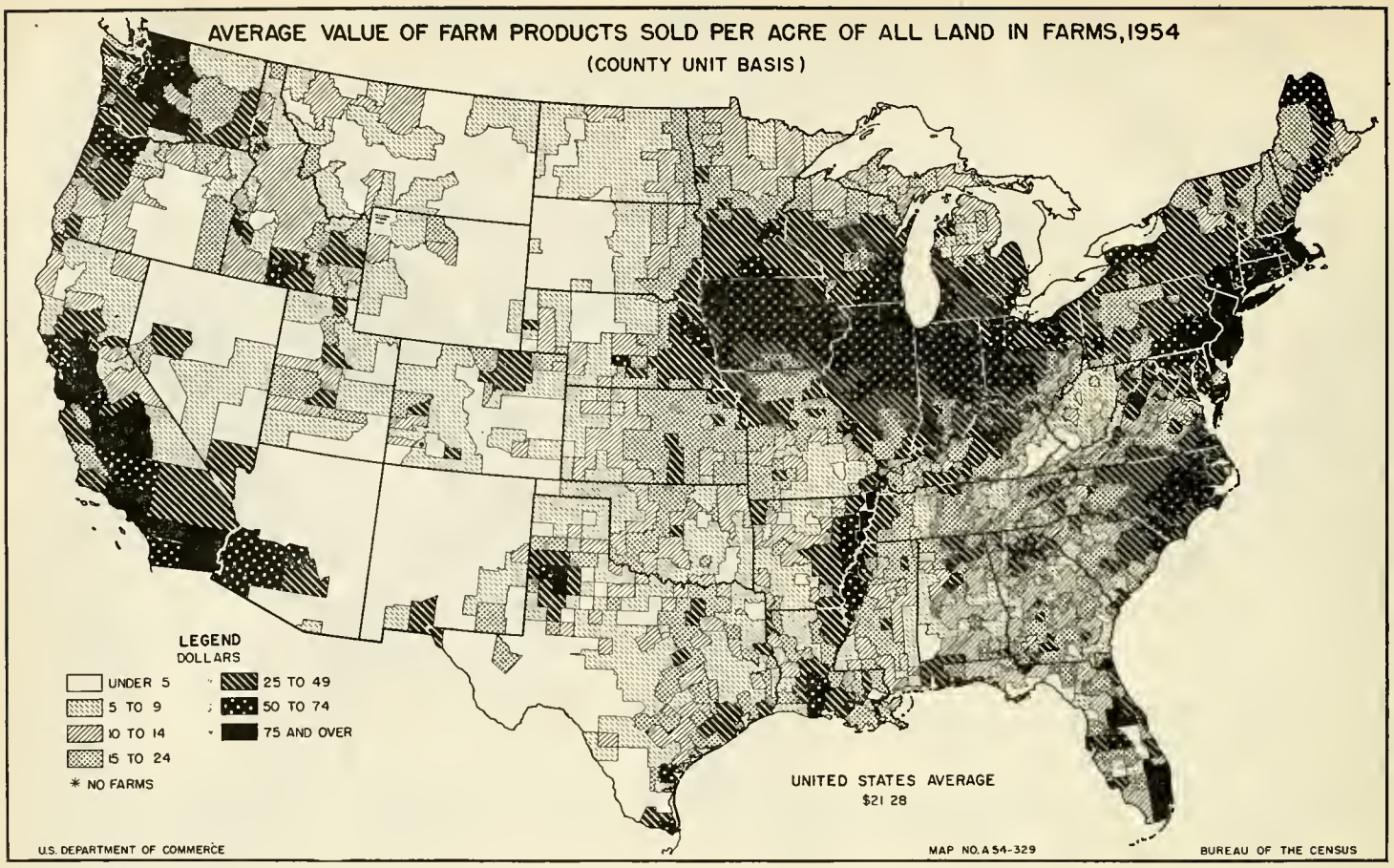
feed the growing population was coming from the rapid expansion of the cropland acreage. Since 1920, the acreage of cropland has remained nearly stationary. However, farm output continued to increase after 1920 and since 1940 the rise has been very sharp. This means that it has been possible to feed the increasing population of the Nation and with a substantially improved diet.

Acreage on which commercial fertilizer was used, 1954.—Some striking regional changes in the use of fertilizer in the United States have occurred in the last 25 years. In 1929, very little fertilizer was used in the Corn Belt, Great Plains, and Western States. Most of the fertilizer used a quarter of a century ago was used in the following States or areas: North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, New Jersey, Delaware, Maryland, southeastern Virginia, southeastern Pennsylvania, northeastern Maine, the Connecticut River Valley of Connecticut and Massachusetts, and the Los Angeles area of California.

In 1954, commercial fertilizer was used on 123 million acres of cropland and pasture. Lime was applied to 11 million acres. The accompanying map shows the distribution of fertilizer use in 1954. When this map is studied against the background of the above statements relative to the use of fertilizer in 1929 the following striking changes in the distribution of its use may be noted. Half of the acreage fertilized in 1954 was in the Corn Belt, Great Plains, and Western States. In 1929, these areas accounted for only a sixth of the total expenditure made for commercial fertilizer used in the United States. About two-fifths of the expenditure for fertilizer in 1929 was concentrated in the Piedmont and Coastal Plain parts of North Carolina, South Carolina, Georgia, and Alabama.

Most of the fertilizer used in 1929 was applied to the more intensively cultivated crops, especially to cotton, tobacco, fruit, truck, and potatoes. These crops have continued to absorb an important part of the fertilizer applied, but several other crops and pasture that were not formerly fertilized to any great extent are now widely fertilized.

In 1954, commercial fertilizer was applied to 18 million acres of hay and pasture, to 47 million acres of corn, to more than 11 million acres of wheat, and to about 3 million acres of oats. Cotton, tobacco, fruits, vegetables, and potatoes, which were widely fertilized in 1929, were other major crops on which fertilizer was extensively used in 1954. About 10 million acres of cotton, more than 1 million acres of tobacco, and 6 million acres of fruit, vegetables, and potatoes were fertilized. This means that nearly all of the tobacco; two-thirds of the fruit, vegetables, and potatoes; three-fifths of the corn; about half of the cotton; and a fourth of the acreage of wheat had some application of fertilizer in 1954.


AVERAGE VALUE OF FARM PRODUCTS SOLD PER ACRE OF ALL LAND IN FARMS, 1954
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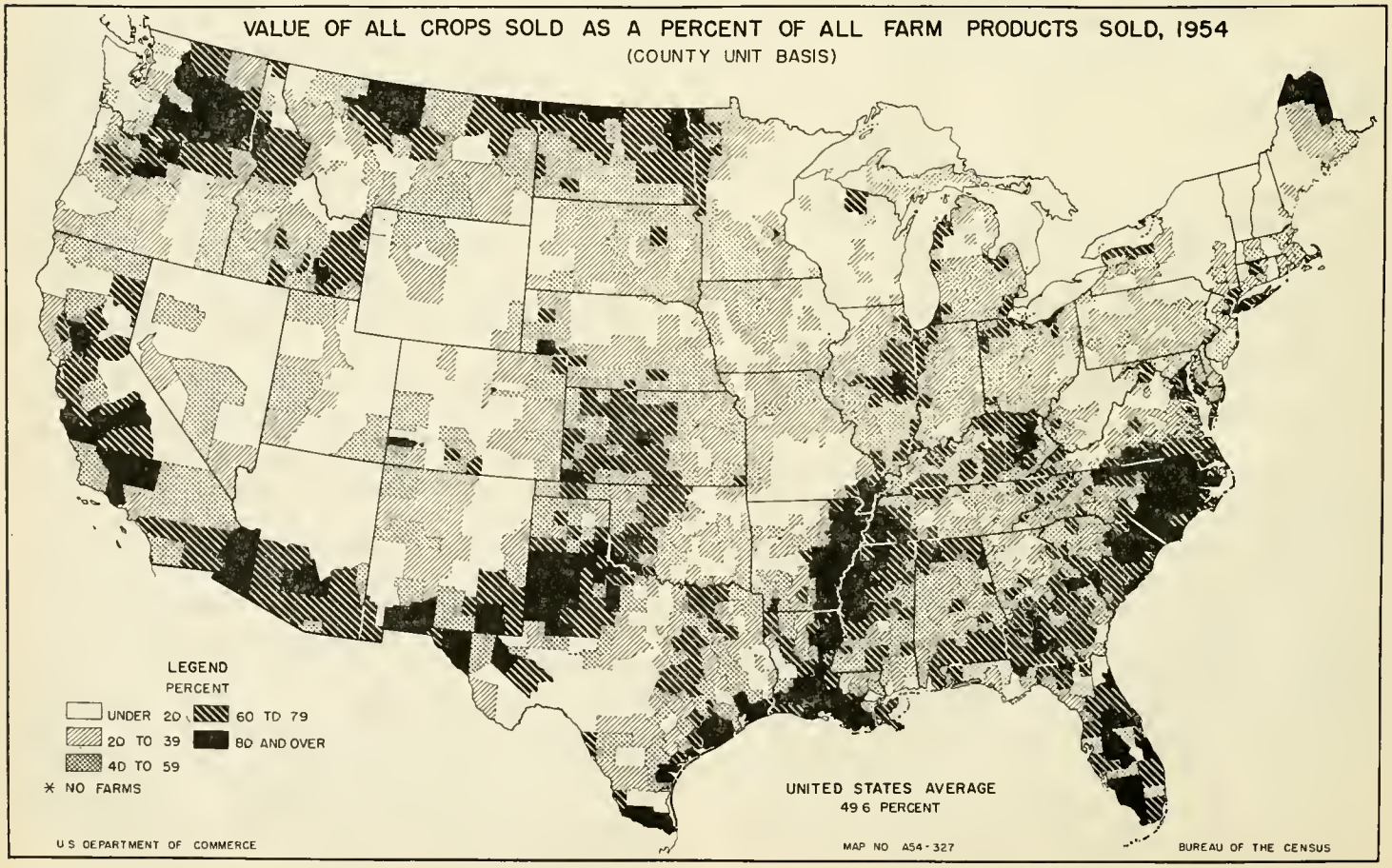
* NO FARMS
UNITED STATES AVERAGE
$21 28
U.S. DEPARTMENT OF COMMERCE
MAP NO. A54-329
BUREAU OF THE CENSUS


VALUE OF ALL CROPS SOLD AS A PERCENT OF ALL FARM PRODUCTS SOLD, 1954
(COUNTY UNIT BASIS)
LEGEND
PERCENT
UNDER 20
20 TO 39
40 TO 59
60 TO 79
80 AND OVER
* NO FARMS
UNITED STATES AVERAGE
49 6 PERCENT
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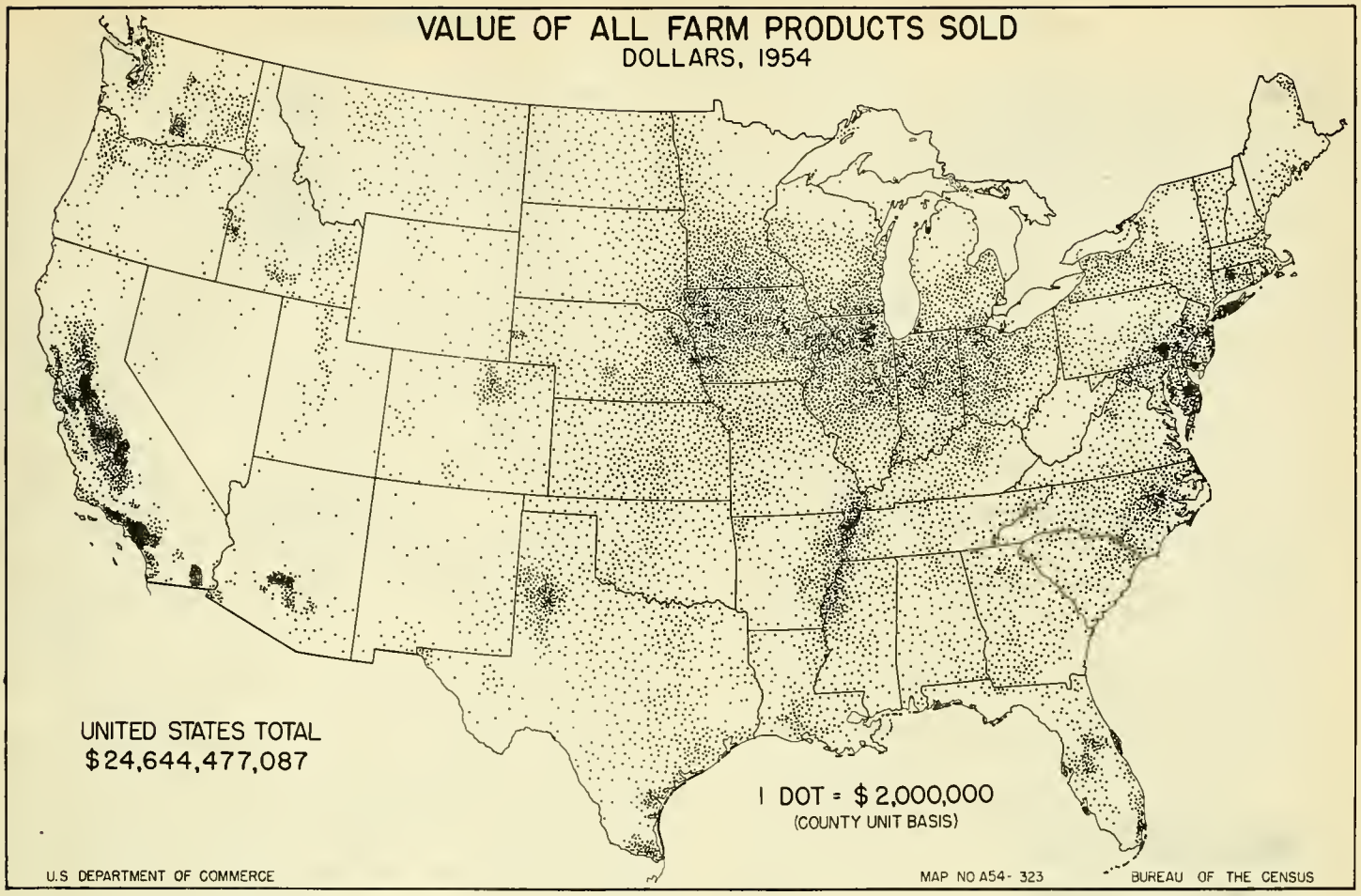
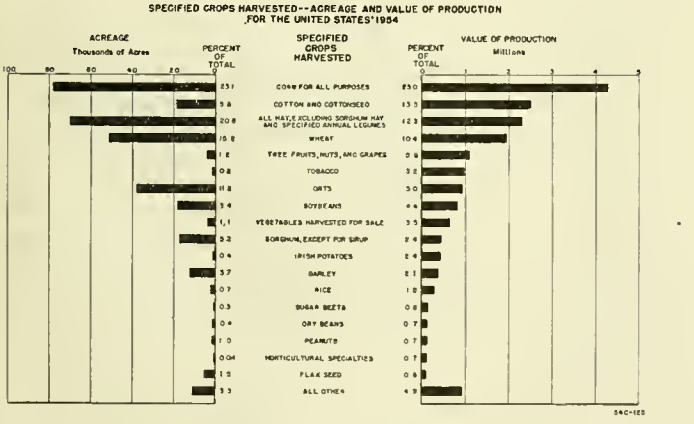
MAP NO A54-327
BUREAU OF THE CENSUS





Changes in use of fertilizer and farm income.—Use of fertilizer has increased sharply in the United States during the last 25 years. Prior to about 1948 the curve showing the quantity of fertilizer used coincided closely with the curve showing realized gross income. But during the last few years, the use of fertilizer has continued to rise sharply even though gross farm income has declined. This increased use of fertilizer is additional reason for the small change in cropland since 1920. Increased applications of fertilizer are enabling farmers to produce more on the present acreage of cropland and pasture.

Average value of farm products sold per acre of all land in farms.—The average value of farm products sold per acre of all land in farms is highest in those areas with inherently fertile soils and where a high proportion of the land in farms is used as cropland. Such areas include the Corn Belt and the lower Mississippi Valley. Another group of areas with high average values are those in which high value crops make up an important part of the farm products sold. Areas in which average values of farm products sold per acre are low are most extensive in the Western States, where large acreages of pasture and grazing land are needed for livestock production. In the Eastern States, rough topography and poor soils are commonly associated with a low value of production per acre in numerous areas.

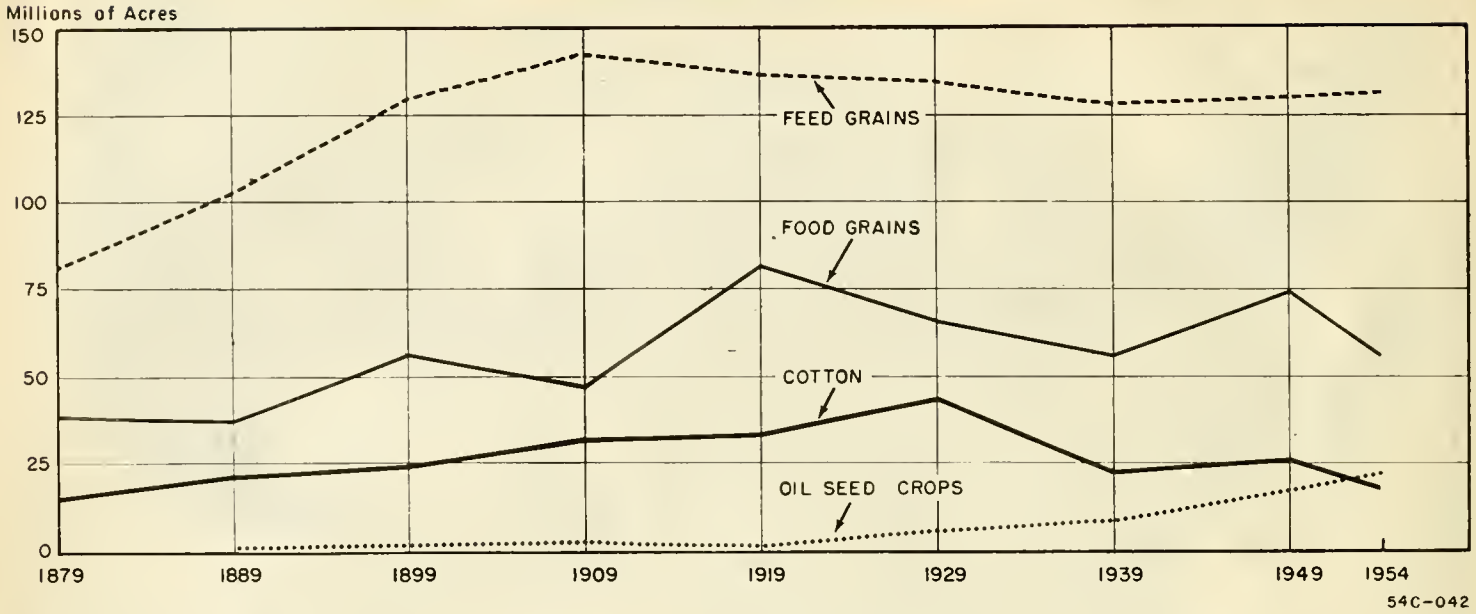
Value of all crops sold as a percentage of all farm products sold.—Crops sold in 1954 were valued at $12.2 billion, which accounts for half of the total value of all farm products sold. In 1949, crops sold accounted for only 44 percent of this total.

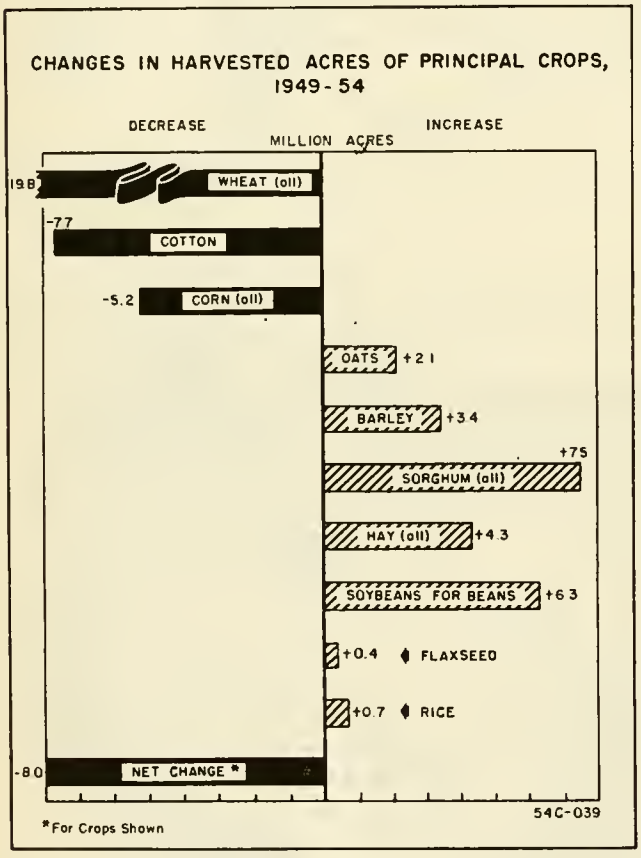
Several of the areas in which the value of crop production is high, as shown by the accompanying map, have very little livestock production. Such areas include the Middle Atlantic and Southeastern Coastal Plain where such crops as tobacco, cotton, vegetables, and fruit are important; the lower Mississippi Valley and the Southern High Plains cotton areas; and the Columbia River Basin wheat and small grains area. In parts of the Corn Belt and in many of the irrigated valleys of the West, the value of livestock and crop production is more nearly equal.

Value of all farm products sold.—The value of all farm products sold totaled $24.6 billion in 1954. In California, the value of farm products sold exceeded $2 billion; and in Iowa, Texas, and Illinois the amount exceeded $1 billion. The Corn Belt has the largest area of contiguous counties with a high value of farm products sold, but some of the heaviest concentrations are in irrigated areas in the West. Similar high-value production areas are associated with such products as tobacco in eastern North Carolina and in the Connecticut River Valley, cotton in the lower Mississippi Valley, citrus fruit and vegetables in Florida, and vegetables and broilers in the Delmarva peninsula.

Whereas only about two-fifths of the value of all crops sold comes from farms located in the Northern States, about two-

ACREAGES IN FOOD GRAINS, FEED GRAINS, OIL SEED CROPS, AND COTTON FOR THE UNITED STATES: 1879 - 1954





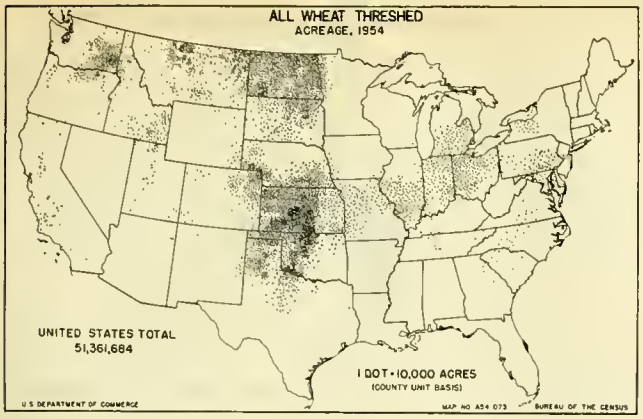
thirds of the total value of all livestock and livestock products sold is from the Northern States. Forest products sold from farms, which totaled $130 million in 1954, are concentrated principally in the Northeast, Southeast, and the Pacific Northwest.

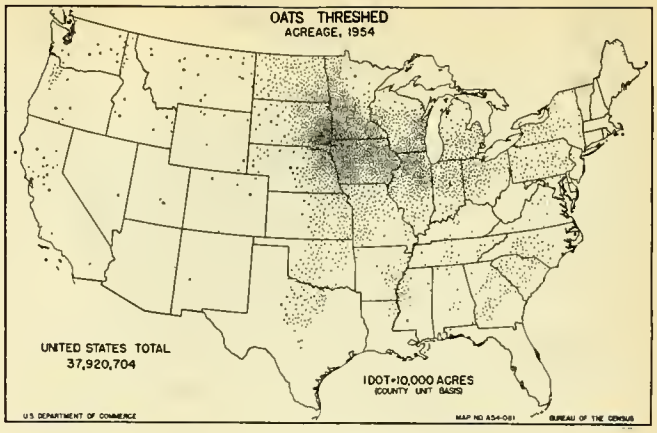
Specified crops harvested—acreage and value of production.—Corn is the leading crop in the United States both from the standpoint of acreage harvested and value of production. All hay crops (excluding sorghum hay and specified annual legumes) occupy the next largest acreage but cotton and cottonseed rank second in value of production. Corn, cotton, wheat, hay, and oats account for about three-fourths of the total acreage of specified crops harvested and about two-thirds of the farm value of all crops produced in 1954.

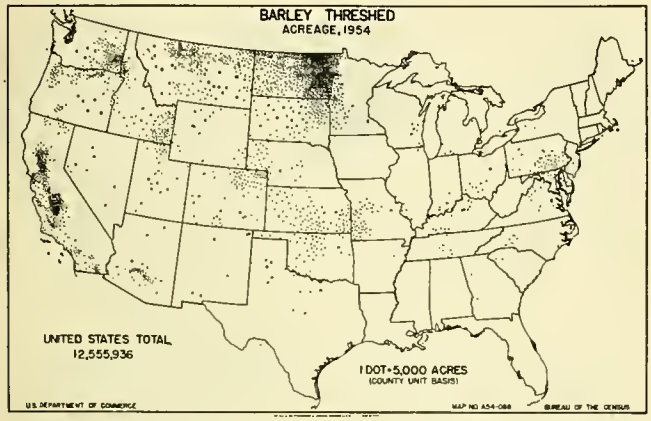
Acreages in food grains, feed grains, oilseed crops, and cotton: 1879–1954.—The long-run changes in the acreage used for the production of these different categories of crops are shown in the accompanying chart. Considerable fluctuation in acreage used for the production of food grains has been characteristic. The acreage used for these food grains—wheat, rice, rye, and buckwheat—dropped by more than 19 million acres between 1949 and 1954. This sharp decline is closely related to the existence of acreage controls on the production of wheat in 1954 and the absence of such controls in 1949. The total acreage of feed grains—corn, oats, barley, grain sorghum, and mixed small grains—occupied about the same acreage in 1954 as in 1949; but some important shifts occured within this group of crops. Corn harvested for grain declined while the acreage of sorghum harvested for grain increased markedly. Acreages of barley and oats also increased. The acreage of cotton declined sharply during this period and the acreage used for oilseed crops continued to increase. The acreage used for oilseed crops has increased in nearly every decade covered by the accompanying chart. The principal oilseed crops other than cotton are soybeans, flax, and peanuts.

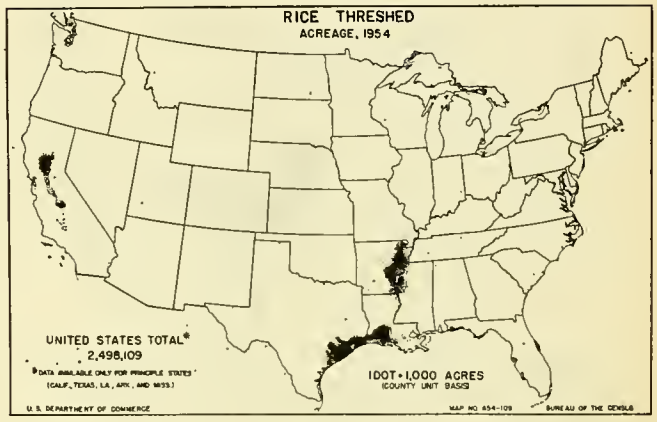
Expanding use of vegetable oils for food and industrial purposes has contributed greatly to the long-run increase in the production of these crops. Between 1949 and 1954 most of the increase in acreage used for oilseed crops was in soybeans, which increased from 10.1 to 16.4 million acres. Diversion of acreage from allotment crops to soybeans is a significant reason for this substantial increase in soybean acreage. Acreage in peanuts was reduced sharply, mainly because of the allotment program.

Changes in harvested acres of principal crops, 1949–54.—Major shifts in the acreage used for different crops occurred between 1949 and 1954 mainly because of acreage allotment programs. The acreage of wheat and cotton was reduced by about 28 million acres. Much of the acreage taken out of these crops is used to produce feed grains, soybeans, and hay. The acreage of oats, barley, all sorghums, all hay, and soybeans increased by nearly 24 million acres. Cultivated summer fallow also increased. As acreage allotments for wheat were lowered, many farmers decided to grow a higher proportion of their wheat crop on cropland that had been fallowed in order to increase yields.









PRINCIPAL CROPS

Wheat.—Wheat threshed in 1954 was 20 million acres less than in 1949. This sharp reduction in wheat acreage reflects largely the existence of an acreage allotment program in 1954 as contrasted with 1949 when acreage controls did not apply. This large reduction in acreage affected all of the major wheat areas, but the general pattern of wheat distribution remains essentially the same as that for 1949.

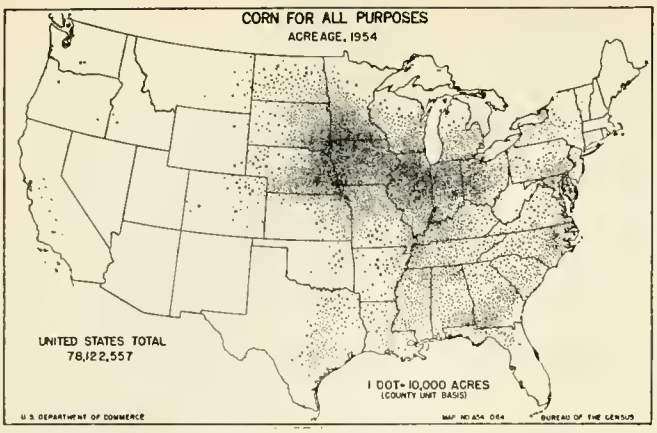
At present spring wheat is grown chiefly in North Dakota, South Dakota, and Montana. Secondary areas are found in Washington, Oregon, Idaho, and western Minnesota. Only very scattered acreage is found elsewhere. Winter wheat is much more widely grown as may be observed by looking at the accompanying map. In a few instances, spring and winter wheat are grown in the same areas.

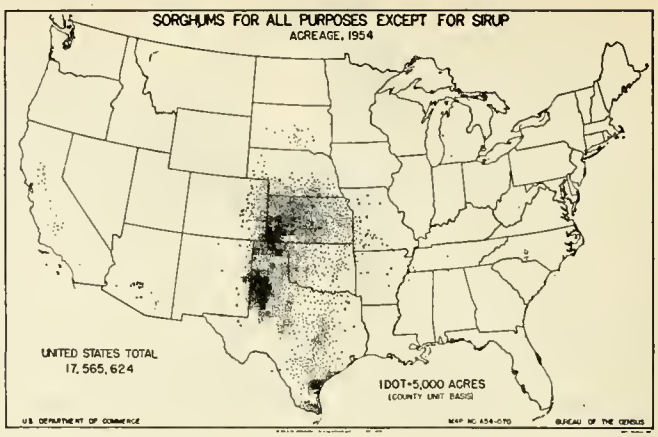
Oats.—The major concentration of oats is situated just east of the leading wheat-producing areas in the Great Plains States. The major oat-producing area also includes Iowa, southern Minnesota and Wisconsin, and northern Illinois. In the eastern part of the Corn Belt, oats are a less important crop than in the western part. Winter oats rather than spring-planted oats are grown in the Southern and the Pacific States.

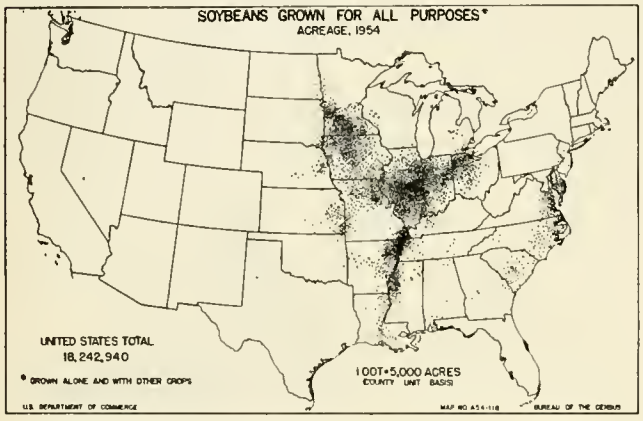
Oats rank next to corn as the principal feed grain in the United States. The reliance formerly placed upon horses and mules for farm power and the widespread acceptance of oats as a good nurse crop for clover, timothy, and other tame grasses, along with the tolerance of oats for poor soils, help to explain the present importance of this crop in American agriculture.

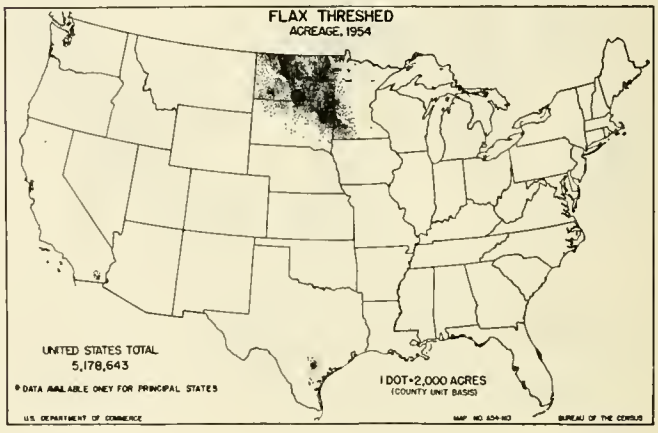
Barley.—Most of the barley in the United States is produced in the 17 Western States and in Minnesota. The leading barley-producing area is in eastern North Dakota and the adjacent Red River Valley area of Minnesota. Nearly a third of the total United States acreage is found in these two States. California is now second to North Dakota in acreage harvested, having lost its position as the leading State which it held during the last quarter of the 19th century and the first quarter of the present century. Widespread diversion to barley of land taken out of wheat production in 1954, under the allotment program resulted in a marked increase in acreage of barley for that year. Some of the areas formerly important for their production of barley for malting purposes such as southeastern Wisconsin, southeastern South Dakota, southwestern Minnesota, and northwestern Iowa now grow very little barley. About two-thirds of the barley crop is now used for feed and one-third for malting. The latter use has increased from less than a fourth in 1939 to about a third now.

Rice.—The total acreage of rice threshed in 1954 was nearly three times as great as that in 1939. Production was greatly accelerated to accommodate export needs for areas where prewar trade channels had been disrupted by war. The production of rice in the United States is now mainly concentrated in 4 States, although production of rice has increased sharply during the last 5 years in some of the Delta counties of Mississippi. The coastal prairies of Louisiana and Texas, the prairie and lowland areas of eastern Arkansas and the adjacent lowlands of Mississippi, and the Sacramento Valley of California are the present rice-producing areas. All of these areas have heavy subsoils that retain irrigation water well and all areas have climates favorable to rice culture. Highly mechanized methods are now used in producing rice in the United States.









Corn.—The total acreage of corn for all purposes was reduced by about 5 million acres between 1949 and 1954. The 12 North Central States continued to have about seven-tenths of the total acreage in the United States. Corn is more widely grown than wheat in the United States, although very little is raised in the 11 Western States, the western part of the Great Plains States, and the New England States. During the last 50 years, the acreage of corn declined by 20 to 25 million acres. Much of this decline has occurred in Kansas, Oklahoma, and Texas where sorghums have replaced corn as an important feed crop. During this period the acreage of corn in southeastern South Dakota and southwestern Minnesota has increased substantially. Hybrid varieties adapted to a shorter growing season have been a factor in this northward shift of corn production.

Sorghums.—Nearly all sorghums grown in the United States are grown to feed livestock, either as grain, forage, or fodder. The use of sorghums as a source of livestock feed in the Southern Plains helps account for the major concentration of acreage. As sorghums require less rainfall and withstand drought better than corn, this crop has become an important feed crop in Kansas, Oklahoma, and Texas. More than four-fifths of the total acreage of sorghums grown for all purposes except sirup is found in these three States. Three heavy concentrations are located in southwestern Kansas and adjacent Oklahoma and Texas, in the high plains of western Texas, and in the Corpus Christi area of Texas.

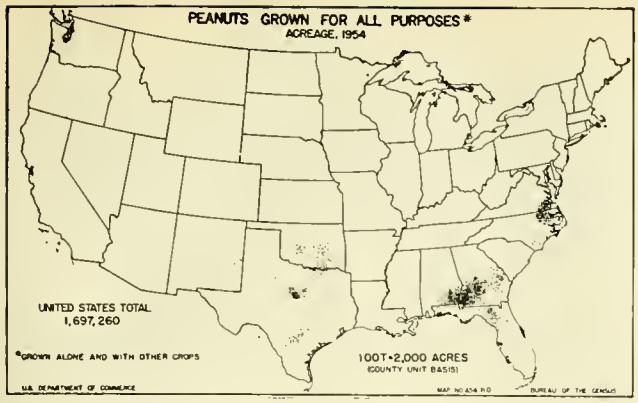
Sorghums are not grown for grain in the Northern Plains because of climatic limitations. For the varieties of grain sorghum now grown in the United States, a frost-free season of 140 days and a mean summer temperature of at least 70° F. is required. Annual rainfall should total 15 inches or more. Some sorghum is grown for forage north of the principal grain-producing areas.

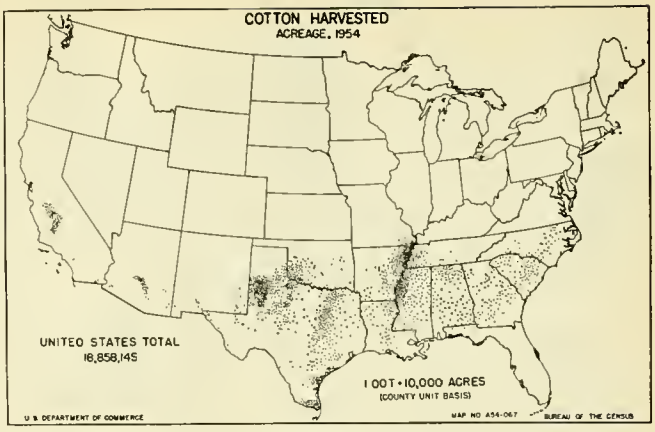
Soybeans.—The acreage of soybeans grown for all purposes in 1954 totaled 18.2 million acres compared with 12.3 million acres grown in 1949. The diversion of acreage from crops included in the crop-allotment program is important in explaining this substantial increase. Nearly all of the increase occurred in the areas that were growing soybeans in 1949.

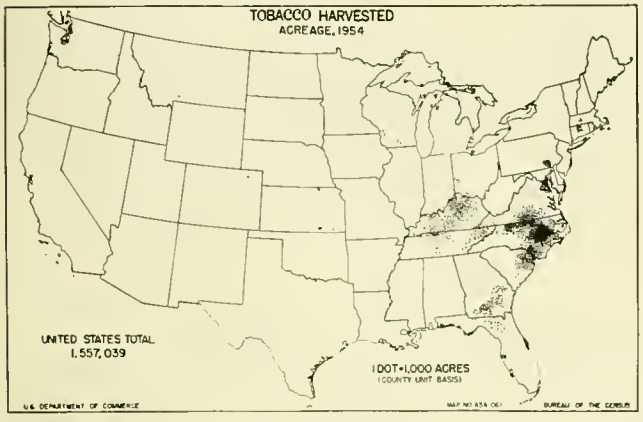
Three major and two secondary concentrations of soybean production are shown by the accompanying map. The leading area of soybean production is centered in the eastern part of the Corn Belt running from south-central Illinois to northwestern Ohio. The acreage of soybeans in Illinois, Indiana, and Ohio comprises two-fifths of the total United States acreage. Another major concentration is in the Mississippi Delta area stretching from southern Illinois to Louisiana. Northwestern Iowa and southwestern Minnesota is the third major area. The southwestern part of the Corn Belt in Missouri and eastern Kansas and the southeastern coastal plain are two secondary areas of soybean production.

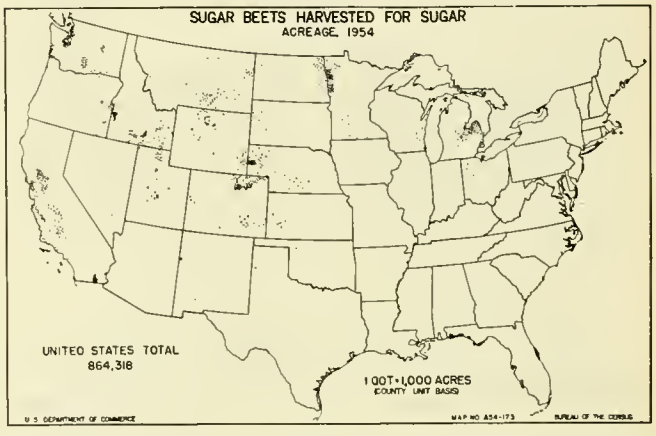
Flax.—Most of the acreage of flax in the United States is concentrated in North Dakota, northern and eastern South Dakota, and western Minnesota. Two secondary areas of production are located in the Imperial Valley of California and north of Corpus Christi, Texas. The total acreage in flax in 1954 was greater than that for 1949. This may be attributed mainly to the wheat acreage-allotment program in effect in 1954. The acreage sown to flax has been subject to wide fluctuations from year to year. Nearly all flax in the United States is grown for the seed rather than for the fiber.

Peanuts.—The production of peanuts is almost entirely restricted to the southeastern coastal plain and to eastern Texas and Oklahoma. From the accompanying map, it may be noted that there are two principal concentrations in the southeastern









coastal plain—one in northeastern North Carolina and southeastern Virginia and the other in southwestern Georgia, southeastern Alabama, and northern Florida. In Texas and Oklahoma, the Cross Timbers area has the largest acreage used for peanuts.

Peanuts need summers that are long and warm. The best seasonal distribution of precipitation provides a good moisture supply when nuts are developing, followed by drier weather and plenty of sunshine during the harvest period. Both nuts and hay are subject to considerable damage if wet weather coincides with harvesting. Fine sandy loam soils are preferred for the growing of peanuts. Dark colored soils are avoided where peanuts are grown for roasting in the shell, as discoloration of the shell reduces the market value.

Cotton.—The acreage from which cotton was harvested dropped sharply in 1954 and 1955 from the high acreages reported harvested from 1951 to 1953 by the United States Department of Agricultnre. The existence of an acreage-allotment program during the last 2 years is mainly responsible for this decline.

In 1954, cotton was grown across the entire southern part of the United States from the Atlantic to the Pacific. Nearly all cotton is grown south of latitude 37° N. The two most northern extensions of cotton production are in southeastern Missouri and the southern tip of Illinois and in Merced County, Calif., in the central part of the San Joaquin Valley.

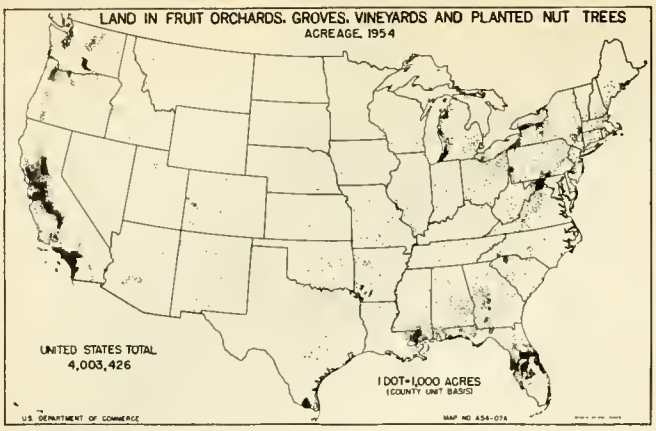
In 1909, practically no cotton was grown west of the 101st meridian which passes through the west-central part of Texas. Today, there are major concentrations of cotton production in the High Plains of western Texas, the Phoenix area of Arizona, and the San Joaquin Valley of California. Much of the cotton grown west of the 100th meridian in Texas is now irrigated, while practically all of that grown in New Mexico, Arizona, and California is irrigated.

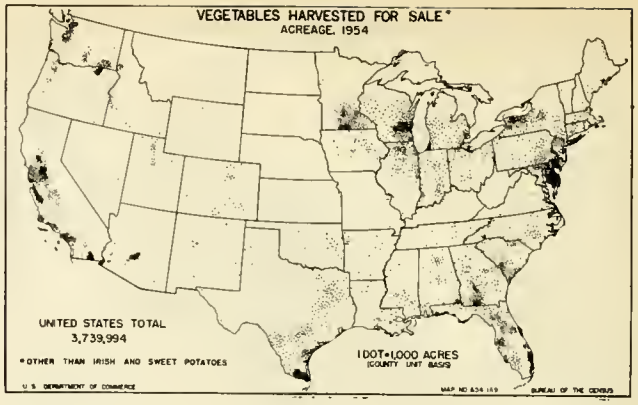
The westward shift of cotton production has been one of the important regional shifts in American agriculture during the last 50 years. In 1909, nearly two-fifths of the acreage of cotton was found in North Carolina, South Carolina, Georgia, and Alabama; but in 1954 these four States accounted for less than a fifth of the cotton acreage.

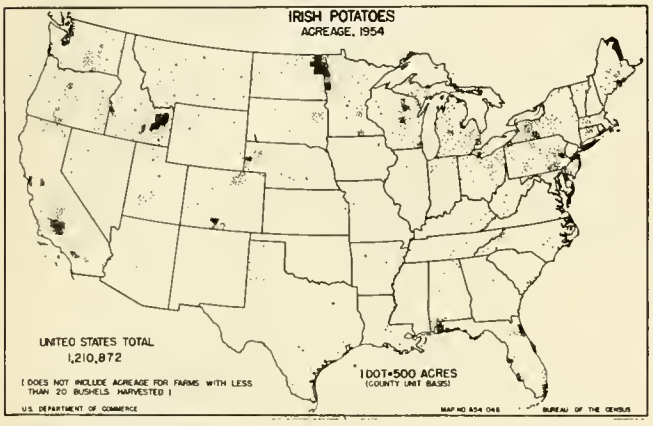
Tobacco.—The four leading States growing tobacco in 1954 were North Carolina, Kentucky, Virginia, and South Carolina. During the last 15 years, the acreage of tobacco has changed very little mainly because of the acreage-allotment program which is attempting to keep supply in line with demand for different types of tobacco. Some regional shifting of production occurred between 1949 and 1954, when the acreage of tobacco grown in Kentucky declined by about 14 percent while that in North Carolina, Virginia, and South Carolina increased by about 11 percent. This shift in acreage reflects some of the continuing changes in demand for different types of tobacco. In 1909, Kentucky had twice as much acreage in tobacco as North Carolina, but in 1954 the North Carolina acreage was more than twice that of Kentucky.

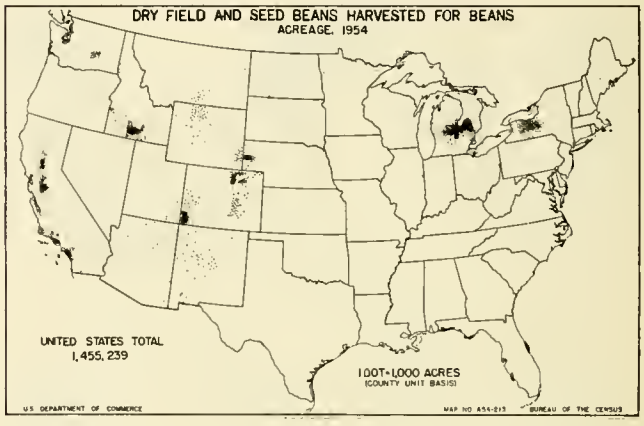
The two major tobacco-producing areas are in southern Virginia, North Carolina and northeastern South Carolina, central and western Kentucky, and adjacent northern Tennessee. Other smaller concentrations of tobacco are also found in southern Georgia and Northern Florida; southern Maryland; Lancaster County, Pa.; Connecticut Valley of Connecticut and Massachusetts; eastern Tennessee; and southwestern Wisconsin.

Sugar beets.—Sugar beets are grown almost entirely in the Western and North Central States. Most of the acreage is irrigated, although some of the eastern areas continue to grow beets without irrigating. Sugarcane is the other principal crop from which domestic sugar is refined in the United States. Practically all of the sugarcane grown for sugar is located in southeastern Louisiana and just south of Lake Okeechobee in Florida.









Land in orchards.—The total acreage reported in bearing and nonbearing fruit orchards, groves, vineyards, and planted nut trees in 1954 was 4 million acres compared with 4.7 million acres reported in 1950. Part of this decline may be attributed to the fact that the 1950 data include acreage for farms reporting half of an acre or more in this use, whereas in 1954 the acreage is reported only for farms having 20 or more trees or grapevines.

California is the leading fruit-growing State, from the standpoint of both total acreage and variety of fruit produced. A third of the total acreage in fruit orchards, groves, vineyards, and planted nut trees is in California. Other major concentrations are found in central Florida; in the Yakima, Wenatchee, and Okanogan Valleys of Washington; in the Willamette and Hood River Valleys of Oregon; the lower Rio Grande Valley of Texas; southwestern Mississippi; the eastern shore of Lake Michigan; the southern shores of Lake Erie and Ontario; and the ridge and valley section of the Appalachians in West Virginia, Virginia, Maryland, and south central Pennsylvania. Many lesser concentrations are also indicated on the accompanying map.

Climate plays an important role in accounting for the distribution of fruits, nuts, and grapes in the United States. Sometimes striking local differences in temperature and frost hazard associated with topography and nearness to the influence of water account for concentrations of fruit production. The growing of citrus fruits is limited chiefly to the warmer subtropics in areas where topography and soils are also favorable. Deciduous fruits generally have both a northern limit beyond which the winters become too severe and the hazard of frost too great and a southern limit where the period of dormancy becomes too short.

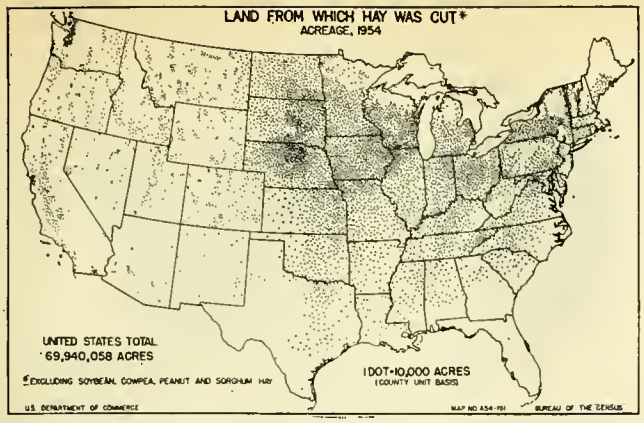
Vegetables.—Vegetables were harvested for sale from about 3.7 million acres in 1954. An undetermined part of this acreage grew more than one crop of vegetables during the year. The vegetable crop harvested for sale is appropriately divided into two categories—that harvested for processing and that harvested for the fresh market. In recent years, slightly more than half of the acreage has been harvested for the fresh market.

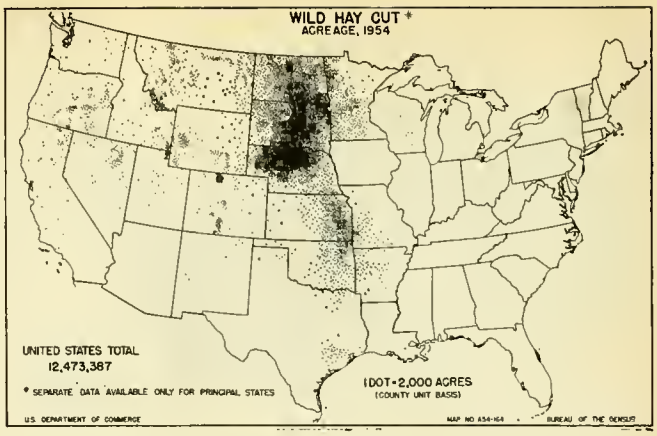
The accompanying map showing the distribution of the acreage of vegetables harvested for sale reveals several major concentrations and many widely scattered secondary areas in which vegetables are grown for sale. The leading States are California, Texas, Florida, Wisconsin, New York, Georgia, Minnesota, New Jersey, and Illinois. The combined acreage of vegetables harvested for sale in these nine States accounts for more than three-fifths of the total United States acreage. The five leading vegetables in terms of acreage harvested were sweet corn, tomatoes, watermelons, green peas, and green snap beans.

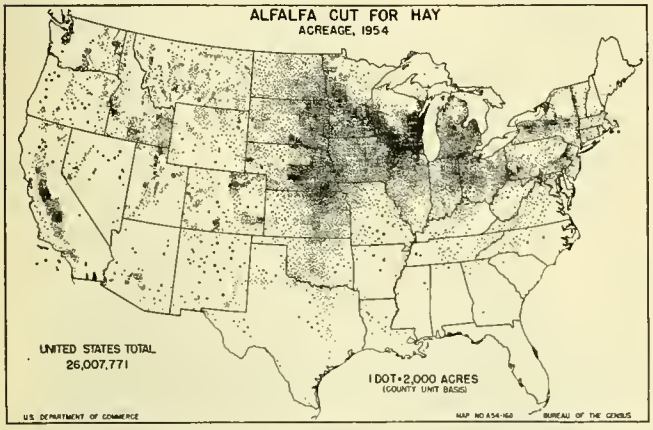
Irish potatoes.—The commercial crop of Irish potatoes is produced mainly in the Northern States, although several early potato areas in the South and in California account for the wide climatic range of this crop in the United States. Potatoes are best adapted to a fairly humid and cool climate.

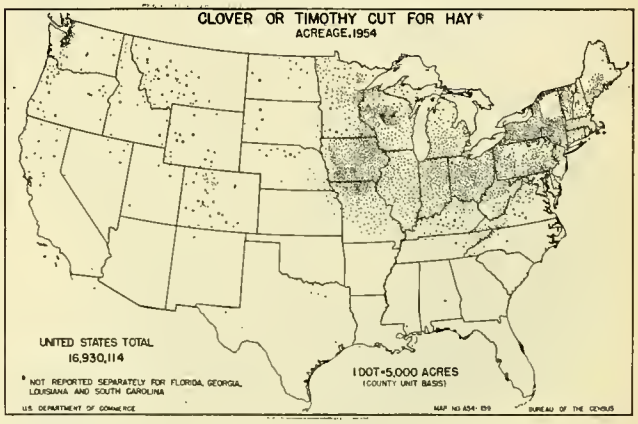
Five relatively small but especially heavy concentrations of Irish potato acreage are found in Aroostook County, Maine; Long Island, N. Y.; the Eastern Shore of Virginia; the Red River Valley of North Dakota and Minnesota; and the Snake River Valley of eastern Idaho. These five areas account for about two-fifths of the total commercial acreage shown by the accompanying map which does not include acreage on farms with less than 20 bushels harvested. In 1954, Idaho had the largest acreage of potatoes followed by Maine, North Dakota, California, New York, and Minnesota.

Dry beans.—Dry beans are produced in both eastern and western areas. Central Michigan and western New York are the major eastern areas and together these two areas account for about a third of the total acreage. In the Western States, dry field beans are produced both with and without irrigation. Most of the dry beans are produced where the mean August temperature does not exceed 70° F.









Land from which hay was cut.—The distribution of the acreage of all tame and wild hay except soybean, cowpea, peanut, and sorghum hay is shown for 1954 by the accompanying map. When the distribution of cattle is compared with that of land from which hay was cut, it may be noted that areas growing hay are usually areas where cattle are also reported. But in several areas in which hay is a minor crop considerable numbers of cattle are grown. These are located mainly in the southern third of the country where cool-season temperatures are high enough to permit grazing during most of the year provided moisture is adequate and plants that will yield forage in all seasons are available.

In 1954 in the Northeastern States, the land from which hay was cut accounted for half of the cropland harvested. This region, in which dairying is a major type of farming and which has relatively long winters, needs a big hay crop. In the Appalachian, Lake States, Northern Plains, Mountain, and Pacific regions, land from which hay was cut accounted for approximately a fifth to a third of the cropland harvested. In the Corn Belt, about a sixth of the cropland harvested was in hay crops; and in the Southeastern, Delta, and Southern Plains States only about a tenth of the cropland harvested was accounted for by hay crops.

The principal tame hay crops are alfalfa, clover, and timothy, small grains cut for hay, and lespedeza. In 1954, alfalfa accounted for 45 percent of the total acreage of tame hay. Clover and timothy, which are grown together and separately, accounted for 29 percent of the acreage. Small grains and lespedeza, respectively, accounted for 8 and 6 percent of the tame hay acreage.

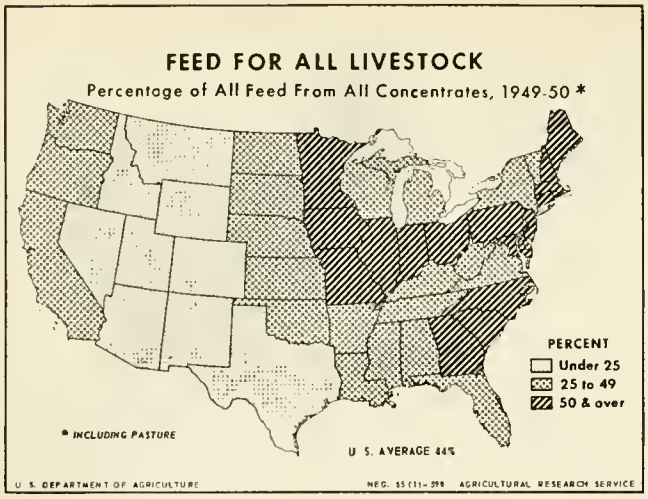
Wild hay.—Most of the wild hay is cut in the Northern Plains States where selected areas of pasture and grazing land are cut for hay. The principal wild hay area, which is a north-south trending belt in North Dakota, South Dakota, and Nebraska lies mainly to the west of the areas where nonirrigated alfalfa is most heavily concentrated. In the Western States some of the wild hay is cut from land along streams that can be irrigated by spreading water over bordering rangeland.

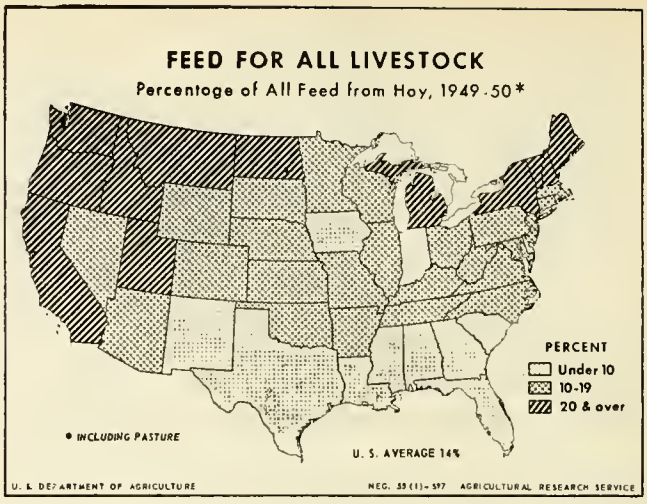
Alfalfa.—The most widely grown hay crop is alfalfa and alfalfa mixtures. The only major area in which alfalfa is of little importance is in the Southeastern States, where a humid climate and sandy soils are not conducive to its production. Soils with adequate lime are the most favorable soils for growing alfalfa. In the Western States, it is a major irrigated crop. It has been widely used in irrigated areas to build up organic matter in soils which under semiarid and arid climates had very little natural organic matter. In the Northern Plains, a considerable acreage of alfalfa is grown without irrigation. It is grown not only for hay but also for seed. Hardy varieties grown in these States are not so easily damaged by winter killing as are varieties grown in warmer areas.

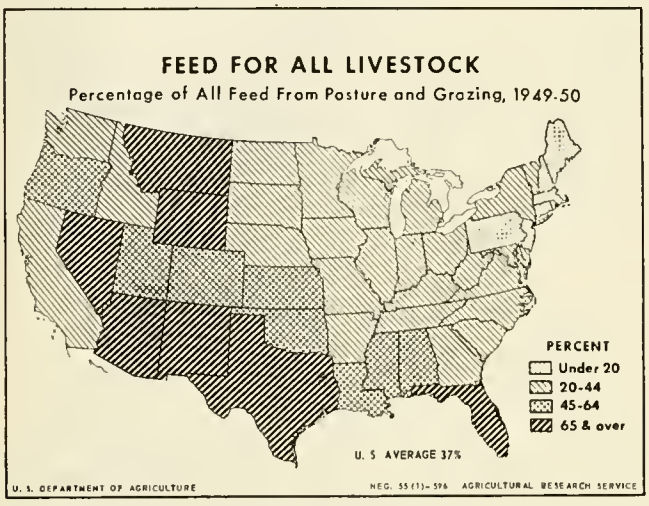
The largest concentration of alfalfa acreage is in the southern part of the Lake States and the northern part of the Corn Belt where soils favorable for its production coincide with areas in which dairying is the major type of farming.

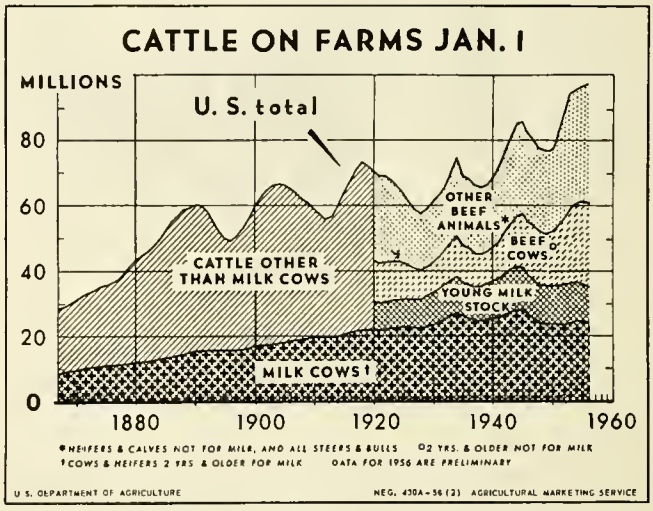
Clover and timothy.—In 1909, the acreage of clover and timothy hay amounted to nearly 37 million acres. In 1954, only 17 million acres were cut for hay. Less emphasis on timothy as a hay crop is noticeable. Part of this decline in the acreage of timothy is associated with the decrease in number of horses used as draft animals.

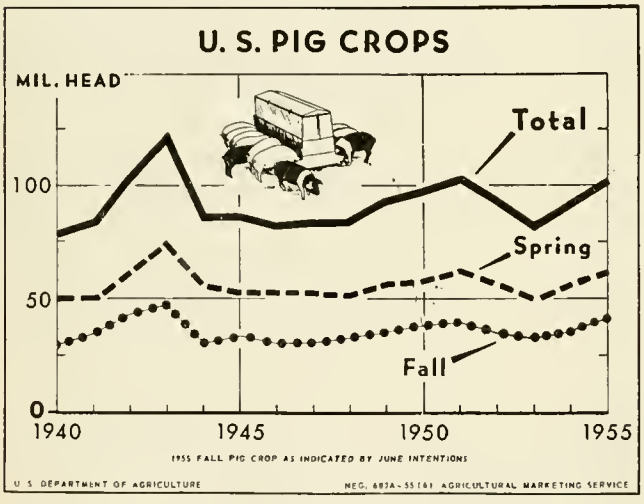
Most of the timothy and clover cut for hay is grown in the North Central and Northeastern States. It is still the major hay crop on many soils that are not suited to production of the higher yielding and better quality alfalfa hay. Timothy and clover as a hay crop is not as expensive to seed and is less likely to suffer damage from winter killing than alfalfa.

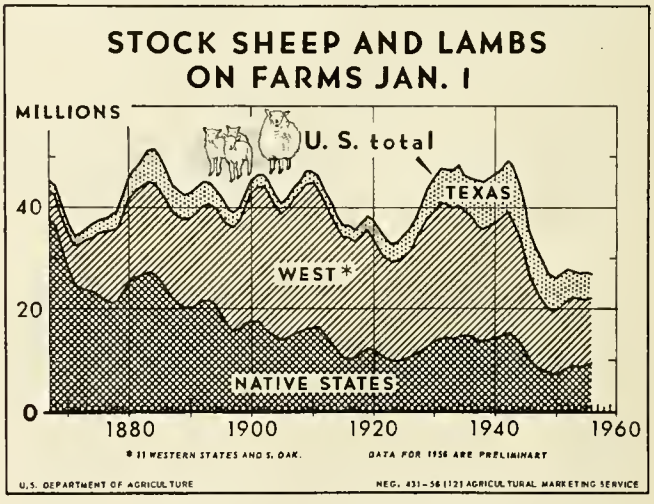










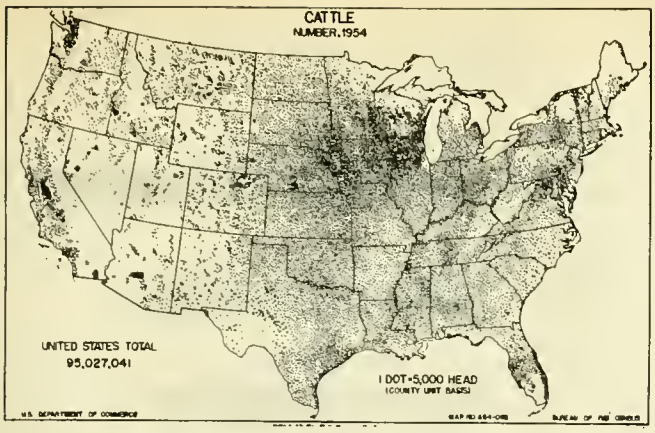


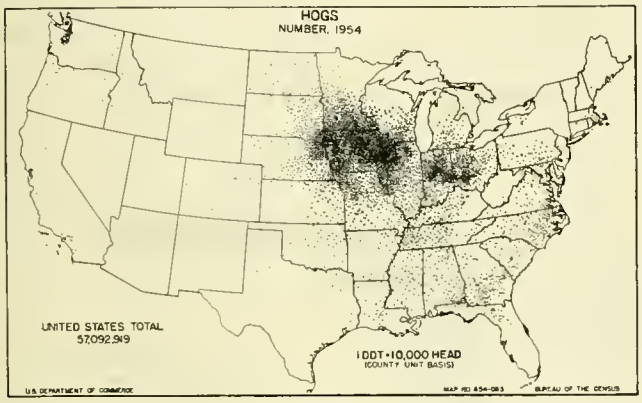
LIVESTOCK

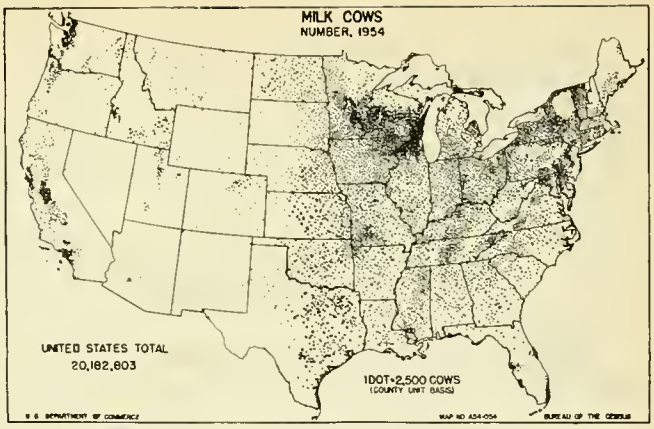
Livestock and livestock products are a major source of food in the American diet. Two-fifths of the total food energy was contributed by these products iu 1954. Although this is approximately the same proportion that was contributed by these products during the 1909-13 period, there have been shifts in the quantities of various livestock products used. More dairy products, except for butter, and more eggs were consumed per capita in 1954 compared with 1909–13. Less animal fats and oils, particularly butter, are now consumed per capita than formerly.

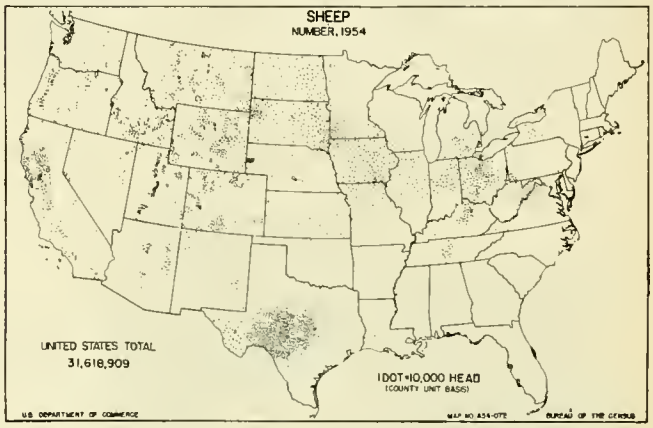
The high proportion of the total nutrients contributed by livestock and livestock products has an important bearing on land use in the United States. Many countries of the world with dense populations have inadequate land resources to permit much consumptiou of animal products, as a greater amount of food energy from a given amount of land can be obtained by using crops directly for food.

Feed for livestock.—In terms of the relative importance of different feeds for livestock, pasture is the most important feed for all livestock with 37 percent of all feed comiug from this source in 1949–50. Corn, which was the next most important feed, supplied 26 percent and hay 14 percent. Oats, barley, and other grains accounted for 9 percent. Animal protein feeds, oilseed









meals, other high-protein feeds, and other byproducts also supplied 9 percent. Silage, beet pulp, skim milk, and seeds made up the remaining 5 percent of the feed for all livestock.

The accompanying maps show the relative importance of concentrates, hay, and pasture and grazing as sources of feed for all livestock by States. Grains and other concentrates are most important as feed for all livestock in the Northern and Southern States except for Texas. Hay accounts for more than 15 percent of all livestock feed in most Northern and Western States. Pasture and grazing account for the highest proportions of livestock feed in Florida, Texas, and the Mountain States.

Cattle.—The number of cattle reported on farms as of January 1 reached an all-time high of more than 95 million head in 1955. Beef cattle have accounted for most of the increase during the past 5 years. During this period, the total number of cattle has increased by more than 17 million head, of which 16 million were beef cattle. Numbers of dairy cattle have remained fairly stable.

The upward trend in cattle numbers has been accompanied by an increase in cattle productivity. This has amounted to a 38 percent gain during the last 30 years. Better animals, better care, more feeding, and greater emphasis on beef types account for this rise in productivity, which has amounted to an average increase of about 5 pounds of live weight of cattle and calves produced per year for each cow on farms at the beginning of the year.

As shown by the accompanying map, cattle are widely raised throughout the United States. The heaviest widespread concentration located in southern Wisconsin, northern Illinois, Iowa, eastern Nebraska, and southern Minnesota includes both the heavy concentration of dairy cattle in the Dairy Belt and large numbers of beef cattle which are more highly concentrated in the western part of the Corn Belt. In the Western States, where cattle are grazed on the extensive rangelands, the highest densities coincide with areas of irrigated agriculture where cattle are fattened for market or where dairying is important, as it is near main centers of population.

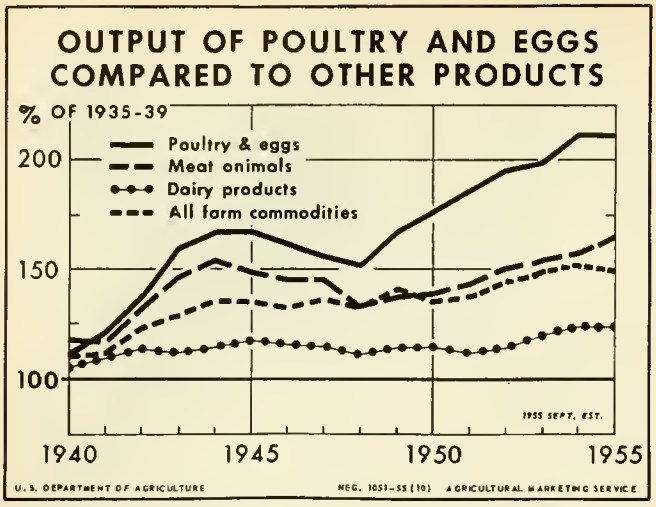
The distribution of milk cows is less widespread than that shown for all cattle. The northeastern Dairy Belt centered in Wisconsin and Minnesota in the North Central States and New York in the Northeast is a conspicuous feature. In California, the influence of metropolitan centers of population on dairying is apparent. Elsewhere, the main concentrations are associated with the distribution of urban population or with physical conditions particularly favorable for dairying.

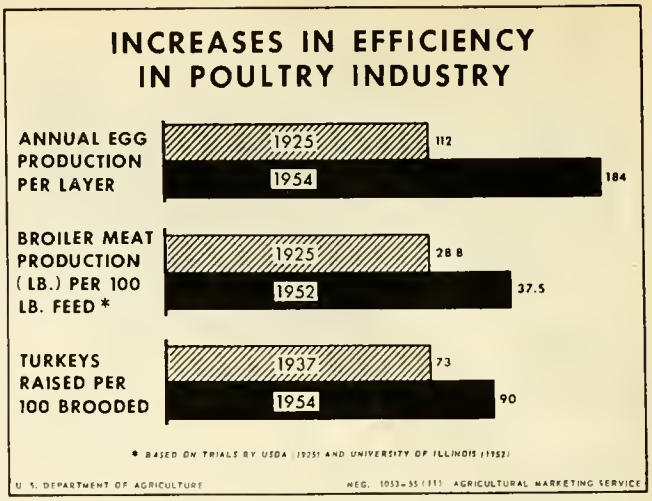
Hogs.—The 1955 pig crop was the fourth largest reported during the last 30 years. Only in 1942, 1943, and 1951 were more pigs reported saved than in 1955. About three-fifths of the pig crop is farrowed in the spring. The demand for pork has declined sharply since 1947. In 1955, a smaller percentage of the consumer's dollar was spent for pork than in any other year since 1913 except in 1945.

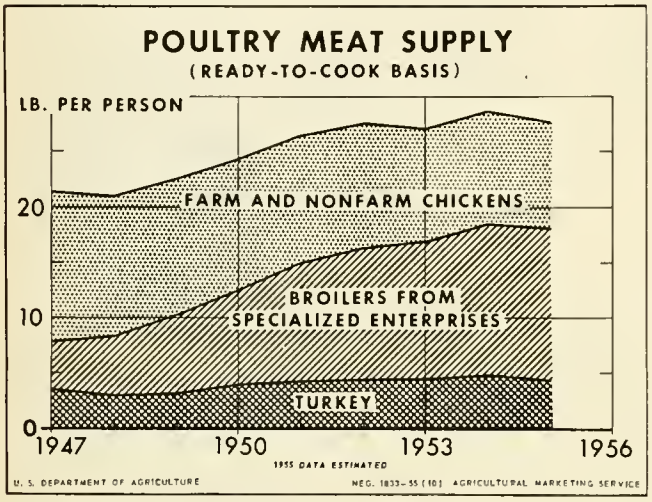
Several reasons for this loss of demand for pork are indicated. There is less demand for fat pork cuts as shown by the fact that demand and price for lean cuts have been more favorable than for fat cuts. As a result of regional shifts in population occuring during the last decade or two, more people are now living in beef-eating regions than formerly. Increased use of home freezers and new ways of selling meat may be more favorable to consumption of beef.

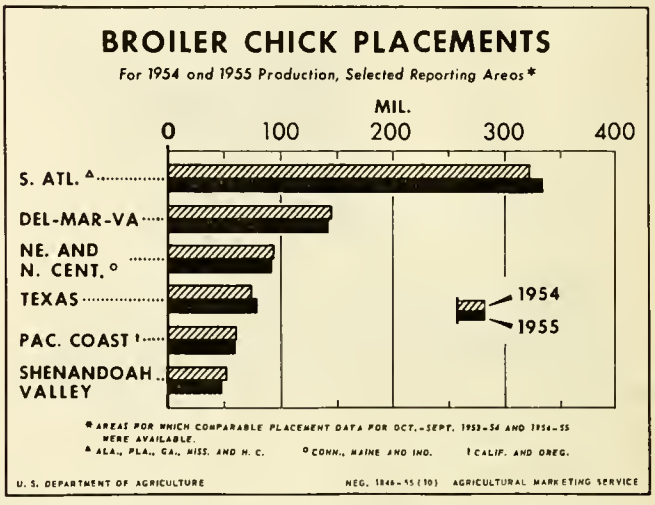
Sheep.—The number of sheep and lambs on farms decreased sharply during the 10 years from 1942 to 1951. A slight rise in numbers in 1951 and 1952 has been followed by subsequent decline. Today, only about half as many sheep and lambs are on farms as compared with the number on farms during the early forties or during the earlier peak period of 75 years ago. The decline in the number of sheep and lambs during the last 15 years has been considerably greater than that occurring between 1909 and 1923. Increased use of synthetic fibers and competition from foreign sheep-raising areas have been major reasons for this sharp decline in the number of sheep.

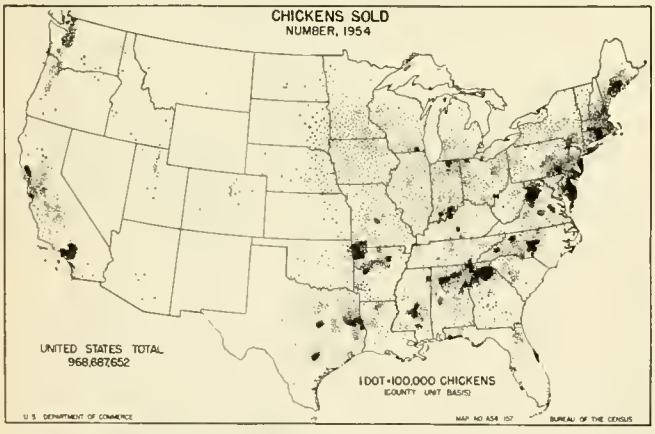
In addition to the change in the total number of sheep for the United States that has occurred, there has been a major shift in sheep numbers among regions, as shown by the accompanying chart and map. The long-term decline in sheep numbers in the Eastern or native States had already started before 1870. In that year, the native sheep States still had three-fourths of the total sheep population. Since World War I, these States have had only about a third of the total sheep population. In 1955, the 11 Western States and South Dakota accounted for half of the total sheep population while Texas accounted for the remaining sixth.

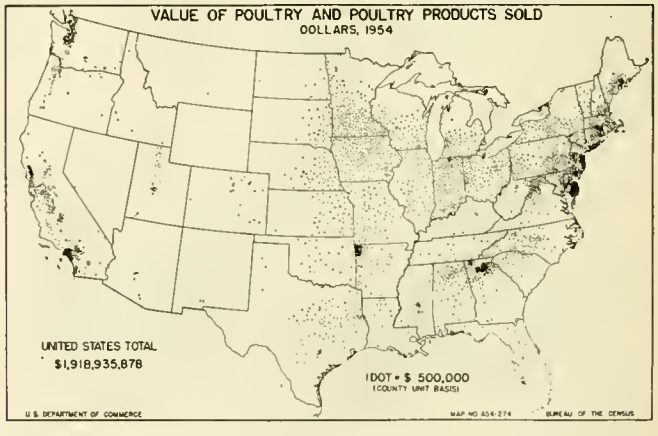












Poultry.—The per capita consumption of poultry and eggs has increased markedly during the last half century. The per capita consumption of chickens and turkeys nearly doubled between 1909 and 1954. Cousumption of eggs per person increased by 50 percent during the same period.

During the last 15 years, the output of poultry and eggs has risen much more rapidly than that of meat animals and dairy products. Significant gains in the efficiency of poultry production have contributed to this relatively greater output of poultry and eggs.

One of the accompanying charts shows the increases in efficiency that have occurred. Annual egg production per layer increased from 112 to 184 eggs between 1925 and 1954. Broiler meat production per 100 pounds of feed increased by 9 pounds between 1925 and 1952. Adoption of practices that are based on findings in genetics, nutrition, disease control, and poultry management have led to more economical egg and poultry meat production.

The growing importance of broilers from specialized enterprises is one of the striking changes that has been taking place in the supply of poultry meat. In 1947, only a fourth of the chicken production was composed of broilers from specialized enterprises. In 1955, three-fifths of the chicken production came from broilers grown on specialized enterprises.

Production of broilers on specialized enterprises is concentrated in a relatively few areas. This is indicated by the accompanying chart and maps. The heaviest concentration of broiler production in a single area is found on the Delmarva peninsula of Delaware, Maryland, and Virginia. The Shenandoah Valley is another area in which heavy local concentration exists. Localized areas of concentrated broiler production are found in several of the Southern States where production of broilers has been on the increase.

CHAPTER 2

FARM MACHINERY AND FACILITIES

INTRODUCTION

	Page
Source and reliability of data	61
Definitions and explanations	61
A farm	62
Farms by size	62
Farms reporting	62
Farms by economic class	62
Farms by type	62
Farms by tenure of operator	63
Farms by class of work power	63

FARM MACHINERY AND FACILITIES

	Page
Farm power	65
Farm tractors	66
Number of tractors on farms	66
Types of tractors	67
Farms reporting tractors	68
Growth of tractor power	68
Farms reporting one or more field tractors	70
Field tractors by size of farm	71
Field tractors by tenure of operator	71
Farms reporting field tractors, by economic class of farm	72
Automobiles on farms	75
Farms reporting automobiles	75
Number of automobiles, by size of farm	77
Number of automobiles, by tenure of farm operator	77
Number of automobiles, by economic class of farm	78
Motortrucks on farms	80
Farms reporting motortrucks	80
Motortrucks per farm	80
Motortrucks on farms—Continued	
Number of motortrucks, by size of farm	82
Number of motortrucks, by tenure of farm operator	82
Number of motortrucks, by economic class of farm	82
Electric power on farms	85
Horses and mules	86
Horses and mules by type and economic class of farm	87
Displacement of work stock by motor vehicles	89
Harvest machines	91
Grain combines	91
Grain combines by size of farm	92
Corn pickers	93
Number of corn pickers by size of farm	94
Pick-up balers	95
Field forage harvesters	97
Combinations of harvest machines	98
Chore equipment	104
Milking machines	104
Power feed grinders	106
Electric pig brooders	107
Service equipment	109
Telephones	109
Television sets	110
Home freezers	111
Piped running water	111
Combinations of service equipment	112
Some results of farm mechanization	113
More work off the farm	113
Machinery investment costs have increased	115
Purchased machine work has increased	116
Greater dependence on petroleum fuel and oil	116

FARM MACHINERY AND FACILITIES—Continued

MAPS AND CHARTS

	Page
Tractors on farms, number, 1954	66
Cropland harvested, acreage, 1954	66
Farms with 200 or more acres of cropland harvested, number, 1954	66
Tractors—increase in number, 1950–1954	67
Crawler tractors, number, 1954	67
Garden tractors, number, 1954	67
Percent of farms reporting tractors, 1954	68
Number of farms reporting field tractors for United States and areas, 1920–1954	69
Crop acres per field tractor on farms, all farms, United States, and areas, 1920 to 1954	69
Number of farms reporting 1, 2, 3, 4 or more field tractors for United States and areas: 1954	70
Number of field tractors on farms by size of farm for the United States and areas, 1954	71
Number of farms reporting field tractors by tenure of operator, for the United States and areas, 1954	72
Number of farms reporting field tractors, by economic class; for United States and areas: 1954	72
Crop acres per tractor, all farms, by economic class; for United States and areas: 1954	73
Automobiles on farms, number, 1954	75
Number of farms reporting automobiles for the United States and areas, 1920–1954	76
Number of farms reporting 0, 1, 2, and 3 or more automobiles for United States and areas: 1954	76
Number of automobiles on farms by size of farm, for the United States and areas, 1954	77
Number of automobiles on farms by tenure of operator, for the United States and areas, 1954	77
Number of farms reporting 1, 2, and 3 or more autombiles by tenure for United States and areas: 1954	77
Number of farms reporting 1, 2, and 3 or more automobiles by economic class for United States and areas: 1954	78
Motortrucks on farms, number, 1954	80
Motortrucks—increase and decrease in number, 1950–1954	80
Number of farms reporting motortrucks for United States and areas: 1920–1954	81
Number of farms reporting 1, 2, 3 or more motortrucks for United States and areas, 1954	81
Number of motortrucks on farms by size of farm, for the United States and areas, 1954	82
Number of motortrucks on farms by tenure of operator, for the United States and areas, 1954	82
Number of farms reporting 1, 2, and 3 or more motortrucks by tenure for United States and areas: 1954	83
Number of farms reporting 1, 2, and 3 or more motortrucks by economic class for United States and areas: 1954	83
Farms reporting electricity—increase and decrease in number, 1950–1954	85
Percent of farms reporting electricity, 1954	85
Horses, number, January 1, 1920	86
Mules, number, January 1, 1920	87
Horses and mules, number, 1954	87
Horses and mules—increase and decrease in number, 1950–1954	87
Number of farms reporting different number of horses and mules by type of farm, for United States and areas, 1954	88
Number of farms reporting different numbers of horses and mules by economic class; United States and areas: 1954	88
Farms with tractor and no horses or mules, number, 1954	89
Farms with tractor and horses and/or mules, number, 1954	89
Farms with horses and/or mules and no tractor, number, 1954	89
Farms with no tractor, horses or mules, number, 1954	89
Grain combines, number of farms reporting, 1954	91
Grain combines—increase in number, 1950–1954	91
Number of grain combines on farms, United States and areas, 1945–1954	92
Number of grain combines on farms by size of farm, for the United States and areas, 1954	92
Number of farms reporting 0, 1, 2, and 3 or more combines by acreage of small grain harvested, United States and areas, 1954	93
Corn for all purposes, acreage, 1954	94
Corn pickers, number of farms reporting, 1954	94
Corn pickers—increase in number, 1950–1954	94
Number of mechanical corn pickers on farms by size of farm, for the United States and areas, 1954	94
Number of farms reporting 1, 2, and 3 or more mechanical corn pickers by acres of corn harvested for United States and areas, 1954	95
Land from which hay was cut, acreage, 1954	95
Hay acreage as a percent of cropland harvested, 1954	96
Pick-up hay balers, number of farms reporting, 1954	96
Pick-up hay balers—increase in number, 1950–1954	96
Number of pick-up balers on farms by size of farm for the United States and areas, 1954	96
Number of pick-up balers on farms by acreage of hay harvested, for the United States and areas, 1954	97
Field forage harvesters, number, 1954	97
Number of field forage harvesters on farms by size of farm, for the United States and areas, 1954	97
Number of farms reporting 0, 1, 2, and 3 kinds of field machines by economic class for the United States and areas: 1954	98

MAPS AND CHARTS—Continued

Page

Milking machines, number of farms reporting, 1954 104
Whole milk sold, number of pounds, 1954 104
Number of farms with milking machines, by type of farm, for the United States and areas: 1954 104
Number of farms reporting milking machines by number of cows milked, for commercial farms for the United States and areas, 1954 106
Power feed grinders, number of farms reporting, 1954 106
Number of farms with power feed grinders by type of farm for United States and areas: 1954 106
Number of dairy farms with power-feed grinders by size of herd for the United States and areas, 1954 107
Electric pig brooders, number of farms reporting, 1954 107
Number of farms reporting pig brooders by size of enterprise, for the United States and areas, 1954 107
Percent of farms reporting telephones, 1954 109
Telephones—increase and decrease in number of farms reporting, 1950–1954 110
Television sets, number of farms reporting, October November 1954 110

Page

Percent of farms reporting home freezers, 1954 110
Percent of farms reporting piped running water, 1954 111
Piped running water, number of farms reporting, 1954 112
Percent of all farm operators working 100 or more days off their farms, 1954 114
Percent of all farm operators working off their farms in 1954 114
Number of farm operators working off their farms, by number of days worked, for the United States and areas: 1930–1954 115
Farm operators working off their farms 100 days or more—increase and decrease in number, 1949–1954 115
Expenditures for machine hire, dollars, 1954 116
Number of farms reporting machine hire, by economic class for the United States and areas, 1954 116
Expenditures for gasoline and other petroleum fuel and oil for the farm business, dollars, 1954 117
Total cost of petroleum products on farms by economic class; for United States and areas: 1954 117
Cost of petroleum products per farm by economic class; for United States and areas: 1954 118

TABLES

Table— Page

1.—Sampling reliability of the estimated number of farms and farms reporting and estimated totals for the United States and 5 areas: Census of 1954 63
2.—Number of farms, average size of farm, and farms reporting specified number of tractors, for the United States and areas: 1954 73
3.—Number of farms, and farms reporting and number of field tractors, by size of farm, for the United States: 1954 73
4.—Number of farms, and farms reporting and number of field tractors, by tenure of operator, for the United States: 1954 74
5.—Number of farms, and farms reporting and number of field tractors, by economic class of farm, for the United States: 1954 74
6.—Percent distribution of all farms, and number of field tractors, by economic class of farm, for the United States and areas: 1954 74
7.—Percent distribution of all farms, and number of field tractors, by tenure of operator, for the United States and areas: 1954 74
8.—Number of farms, and farms reporting and number of automobiles, by size of farm, for the United States: 1954 78
9.—Number of farms, and farms reporting and number of automobiles, by tenure of operator, for the United States: 1954 79
10.—Number of farms, and farms reporting and number of automobiles, by economic class of farm, for the United States and areas: 1954 79
11.—Percent distribution of all farms and number of automobiles, by economic class of farm, for the United States and areas: 1954 79
12.—Percent distribution of all farms and number of automobiles, by tenure of operator, for the United States and areas: 1954 79
13.—Number of farms, and farms reporting and number of motortrucks by size of farm, for the United States: 1954 82
14.—Number of farms, and farms reporting and number of motortrucks, by tenure of operator, for the United States: 1954 84
15.—Number of farms, and farms reporting and number of motortrucks, by economic class of farm, for the United States: 1954 84
16.—Percent distribution of all farms, and number of motortrucks, by economic class of farm, for the United States and areas: 1954 84
17.—Percent distribution of all farms, and number of motortrucks, by tenure of operator, for the United States and areas: 1954 84
18.—Number of farms, and farms reporting by number of horses and mules reported, by economic class of farm, and by type of farm, for the United States and areas: 1954 90
19.—Number of farms, and farms reporting and number of grain combines, by size of farm, for the United States: 1954 99
20.—Number of farms, and farms reporting and number of grain combines, by tenure of operator, for commercial farms, for the United States: 1954 99
21.—Farms reporting and acreage of small grains harvested, and number of grain combines, by the acreage of small grains harvested, for the United States and areas: 1954 99
22.—Number of farms, farms reporting small grains harvested and farms reporting grain combines, for the United States and areas: 1954 99
23.—Number of farms, and farms reporting and number of corn pickers, by size of farm, for the United States: 1954 100
24.—Farms reporting and acres of corn harvested for all purposes, and number of farms reporting corn pickers, for the United States and areas: 1954 100
25.—Farms reporting and acres of corn harvested for all purposes, and number of farms reporting corn pickers, by acres of corn harvested, for the United States: 1954 100
26.—Number of farms, and farms reporting and number of pick-up balers, by size of farm, for the United States: 1954 101
27.—Number of farms, and farms reporting and number of forage harvesters, by size of farm, for the United States: 1954 101
28.—Number of farms, farms reporting and acres of all hay harvested, and farms reporting pick-up balers, by acres of hay harvested and by size of farm, for the United States and areas: 1954 101
29.—Number of farms, and number of farms reporting 1, 2, or 3 kinds of field machines, by economic class of farm, and by type of farm, for the United States and areas: 1954 102
30.—Farms reporting milk cows and farms reporting milking machines, by number of milk cows, for all commercial farms and dairy farms, for the United States and areas: 1954 105
31.—Number of farms, and percent of farms reporting milking machines, by type of farm, for the United States and areas: 1954 105
32.—Number of farms, and percent of farms reporting power feed grinders, by type of farm, for the United States and areas: 1954 108
33.—Number of farms, expenditure, for feed, and farms reporting feed grinders, for dairy farms, classified by size of herd, for the United States: 1954 108
34.—Farms reporting sows farrowing between December 1, 1953, and June 1, 1954, and farms reporting electric pig brooders, for the United States and areas: 1954 108
35.—Number and percent of farms reporting electricity, telephones, and piped running water, for the United States and areas: 1954 112
36.—Number and percent of farms reporting electricity, telephones, and piped running water, by economic class of farms, for the United States: 1954 112

INTRODUCTION

The introduction of mechanical power has brought many striking changes to our farms during the last 3 or 4 decades. The tractor has supplied a major part of this power. Motortrucks, automobiles, and electricity have also been sources of farm power of growing importance during the last quarter of a century. The increases in these new sources of power have been accompanied by large scale reductions in animal work power on farms. With the increased use of new sources of power, the number of farmworkers required to produce food and fiber for a rapidly increasing population has declined significantly. Farm mechanization has had important influences not only upon the number of farmworkers and the output per worker but also upon the amount of agricultural land used to supply the food and fiber needs of the Nation. This report summarizes the important changes in farm mechanization since 1920, indicates the present status of mechanization, and summarizes the effects of increased use of mechanical power and equipment on farms.

Since 1920, the Censuses of Agriculture taken at 5-year intervals have provided information on machinery and facilities on farms. The farm machinery and facility items for which Census statistics have been collected include a considerable number that are used for the farm business, some that are used in the farm operator's home as well as for the farm business and others such as television sets that are used primarily in the farmer's home. Farm machinery was enumerated on the farm on which it was located at the time of the Census. The X's in the following tabular statement indicate the items for which the nationwide Censuses of Agriculture have obtained information during the period, 1920 to 1954.

The number of machines as reported by the Census represents the number on farms. It does not include machines not on farms. In the case of automobiles, the number includes automobiles owned by the farm operator and members of his family and also those owned by hired employees living on the farm.

Source and reliability of data.—The maps and charts presented in this report are based upon statistical data published in the reports of the 1954 and prior Censuses of Agriculture. The data presented in tables 2 to 33 of this chapter and used for the preparation of a number of maps and charts were obtained from a special tabulation of data for a sample of 5 percent of the specified and 1 percent of the remaining farms for the 1954 Census of Agriculture. (For a description of specified farms, reference may be made to the Introduction to Volume II of the reports of the 1954 Census of Agriculture.) As the data given in Tables 2 to 33 are estimates based upon data for a sample of farms, they differ slightly from data for the same items published in other reports of the 1954 Census of Agriculture. The estimates given in these tables are subject to sampling errors. Table 1, page 63, provides measures of the sampling reliability for the data in Tables 2 to 33.

DEFINITIONS AND EXPLANATIONS

The maps, charts, and text employ terminology consistent with the 1954 Census of Agriculture. Definitions and explanations are given for only a few items. For more detailed definitions and explanations of items related to the Census of Agriculture, reference may be made to the Introduction of Volume II of the reports for the 1954 Census of Agriculture.

FARM FACILITY AND EQUIPMENT ITEMS FOR WHICH AN INQUIRY WAS INCLUDED IN THE CENSUS OF AGRICULTURE: 1920 TO 1954

Item on Census questionnaire	1954	1950	1945	1940	1935	1930	1925	1920
Telephone	X	X	X	X	------	X	------	X
Running water	X	------	X	------	------	X	------	X
Electric water pump	------	X	------	------	------	------	------	------
Water piped into a bathroom	------	------	------	------	------	X	------	------
Electric hot water heater	------	X	------	------	------	------	------	------
Kitchen sink with drain	------	------	X	------	------	------	------	------
Electricity	X	X	X	X	------	X	------	------
Power line	------	X	------	X	------	------	------	------
Amount of last monthly bill	------	X	------	------	------	------	------	------
Home plant	------	X	------	X	------	------	------	------
Gas or electric light	------	------	------	------	------	------	------	X
Electric distribution line	------	------	X	X	------	------	------	------
Television set	X	------	------	------	------	------	------	------
Radio	------	------	X	------	------	------	X	------
Home freezer	X	X	------	------	------	------	------	------
Mechanical refrigeration	------	------	X	------	------	------	------	------
Electric washing machine	------	X	------	------	------	------	------	------
Power-driven washing machine	------	------	X	------	------	------	------	------
Electric motors for farmwork	------	------	X	------	------	X	------	------
Milking machine	X	X	X	------	------	------	------	------
Electric chick brooder	------	X	------	------	------	------	------	------
Electric pig brooder	X	------	------	------	------	------	------	------
Power feed grinder	X	------	------	------	------	------	------	------
Electric power feed grinder	------	X	------	------	------	------	------	------
Stationary gasoline engines	------	------	X	------	------	X	------	------

Item on Census questionnaire	1954	1950	1945	1940	1935	1930	1925	1920
Grain combines	X	X	X	------	------	(1)	------	------
Corn pickers	X	X	------	------	------	------	------	------
Pick-up balers	X	X	------	------	------	------	------	------
Field forage harvesters	X	------	------	------	------	------	------	------
Automobiles	X	X	X	X	------	X	------	X
Year of newest model	------	X	X	X	------	------	------	------
Motortrucks	X	X	X	X	------	X	------	X
Year of newest model	------	X	X	X	------	------	------	------
Tractors	------	------	X	X	------	X	X	X
Year of latest model	------	------	------	X	------	------	------	------
Wheel tractors other than garden or crawler.	X	X	X	------	------	------	------	------
Year of newest model	------	X	X	------	------	------	------	------
Garden tractors	X	X	X	------	------	------	------	------
Crawler tractors	X	X	X	------	------	------	------	------
Year of newest model	------	X	------	------	------	------	------	------
Artificial ponds, reservoirs, and earth tanks.	X	------	------	------	------	------	------	------
Upright silos	------	X	------	------	------	------	------	------
Pit or trench silos	------	X	------	------	------	------	------	------
Kind of road surface	------	X	X	X	------	X	X	------
Distance to trading center	------	X	------	------	------	------	X	------
Value of implements and machinery.	------	------	X	X	------	X	X	X

[1] Inquiry asked for number of "combines" on this farm. Data requested were for grain combines used for harvesting and threshing grains or seeds in one operation however, many types or combinations of equipment were reported instead of the type desired and the results of this inquiry were considered not satisfactory for publication.

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A farm.—For the 1954 and 1950 Censuses, places of 3 or more acres were counted as farms if the annual value of agricultural products, exclusive of home-garden products, amounted to $150 or more. The agricultural products could have been either for home use or for sale. Places of less than 3 acres were counted as farms only if the annual value of sales of agricultural products amounted to $150 or more. Places for which the value of agricultural products for 1954 was less than these minima because of crop failure or other unusual conditions, and places operated at the time of the Census for the first time, were counted as farms if normally they could be expected to produce these minimum quantities of agricultural products.

For the 1945 and earlier Censuses of Agriculture, the definition of a farm was somewhat more inclusive. From 1925 to 1945, farms, for Census purposes, included places of 3 or more acres on which there were agricultural operations, and places of less than 3 acres if the agricultural products for home use or for sale were valued at $250 or more. For places of 3 or more acres, no minimum quantity of agricultural production was required for purposes of enumeration; for places of under 3 acres, all the agricultural products valued at $250 or more may have been for home use and not for sale. The only reports excluded from the tabulations were those taken in error and those with very limited agricultural production, such as only a small home garden, a few fruit trees, a very small flock of chickens, etc. In 1945, reports for places of 3 acres or more with limited agricultural operations were retained if there were 3 or more acres of cropland and pasture, or if the value of products in 1944 amounted to $150 or more when there were less than 3 acres of cropland and pasture.

Farms by size.—Farms have been classified by size on the basis of the total land in the farm. The total land includes cropland, pastureland, woodland, and wasteland. All the land under the control of one person or partnership was included as one farm. Control may have been through ownership, or through lease, rental, or cropping arrangement.

Farms reporting.—Farms reporting represent the number of farms with the kind of machinery or facility indicated.

Farms by economic class.—Farms have been classified by economic class for the 1950 and 1954 Censuses of Agriculture. The three criteria used for classifying farms by economic class were: Total value of all farm products sold; number of days the farm operator worked off the farm; and relationship of the income received from nonfarm sources by the operator and members of his family to the value of all farm products sold. Farms were classified into two broad economic groups, namely, "commercial farms" and "other farms." Each of these major groups was further classified.

The "commercial farms" were classified into 6 groups and "other farms," into 3 groups. The following table indicates the criteria for each economic class of farm and the number of farms in each economic class for 1954 and 1950.

CRITERIA FOR THE ECONOMIC CLASSES OF FARMS AND NUMBER OF FARMS IN EACH CLASS, FOR THE UNITED STATES: CENSUSES OF 1954 AND 1950

Class	Number of farms		Criteria		Farms excluded
	1954	1950	Value of farm products sold	Other	
United States, total	4,783,021	5,379,250	XXX	XXX	XXX.
Commercial farms, total	3,327,617	3,706,412	XXX	XXX	XXX.
Class I	134,003	103,231	$25,000 or more	None	Abnormal.
Class II	448,945	381,151	$10,000 to $24,999	do	Abnormal.
Class III	706,929	721,211	$5,000 to $9,999	do	Abnormal.
Class IV	811,965	882,302	$2,500 to $4,999	do	Abnormal.
Class V	763,348	901,316	$1,200 to $2,499	do	Abnormal.
Class VI	462,427	717,201	$250 to $1,199	Less than 100 days of off-farm work by operator, and income of operator and members of his family from nonfarm sources less than value of all farm products sold.	Abnormal.
Other farms	1,455,404	1,672,838	XXX	XXX	XXX.
Part-time	574,575	639,230	$250 to $1,199	100 days or more of off-farm work by operator or income of farm operator and members of his family from nonfarm sources greater than value of all farm products sold.	Abnormal.
Residential	878,136	1,029,392	Less than $250	None	Abnormal.
Abnormal	2,693	4,216	Not a criterion	Institutional farms, experimental farms, grazing associations, community-project farms, etc.	XXX.

Farms by type.—Commercial farms have been classified by type on the same basis for the 1954 and 1950 Censuses of Agriculture. The classification of commercial farms by type was made on the basis of the relationship of the value of sales from a particular source, or sources, to the total value of all farm products sold from the farm. In some cases, the type of farm was determined on the basis of the sale of an individual farm product, such as determined on the basis of sales of a broader group of products, such as dairy products. In other cases, the type of farm was determined on the basis of sales of a broader group of products, such as corn, sorghums, all small grains, field peas, field beans, cowpeas, and soybeans. In order to be classified as a particular type, sales or anticipated sales of a product or group of products had to represent 50 percent or more of the total value of products sold.

The types of commercial farms for which data are shown, together with the product or group of products on which the classification is based, are:

Type of farm	*Product or group of products amounting to 50 percent or more of the value of all farm products sold*
Cotton	Cotton (lint and seed).
Cash-grain	Corn, sorghums, small grains, field peas, field beans, cowpeas, and soybeans.
Other field-crop	Peanuts, Irish potatoes, sweetpotatoes, tobacco, sugarcane, sugar beets for sugar, and other miscellaneous crops.
Vegetable	Vegetables.
Fruit-and-nut	Berries and other small fruits and tree frnits, nuts, and grapes.

Type of farm	*Product or group of products amounting to 50 percent or more of the value of all farm products sold*
Dairy	Milk and other dairy products. The criterion of 50 percent of the total sales was modified in the case of dairy farms. A farm for which the value of sales of dairy products represented less than 50 percent of the total value of farm products sold was classified as a dairy farm if— (*a*) Milk and other dairy products accounted for 30 percent or more of the total value of products sold; and (*b*) Milk cows represented 50 percent or more of all cows; and (*c*) Sales of dairy products, together with the sales of cattle and calves, amount to 50 percent or more of the total value of farm products sold.
Poultry	Chickens, eggs, turkeys, and other poultry products.
Livestock farms other than dairy and poultry	Cattle, calves, hogs, sheep, goats, wool, and mohair, provided the farm did not qualify as a dairy farm.
General	Farms were classified as general when the value of products from one source or group of sources did not represent as much as 50 percent of the total value of all farm products sold. Separate figures are given for three kinds of general farms: (*a*) Primarily crop (*b*) Primarily livestock (*c*) Crop and livestock Primarily crop farms are those for which the sale of one of the following crops or groups of crops—vegetables, fruits and nuts, cotton, cash grains, or other field crops—did not amount to 50 percent or more of the value of all farm products sold, but for which the value of sales for all these groups of crops represented 70 percent or more of the value of all farm products sold. Primarily livestock farms are those which did not qualify as dairy farms, poultry farms, or livestock farms other than dairy and poultry, but for which the sale of livestock and poultry and livestock and poultry products amounted to 70 percent or more of the value of all farm products sold. General crop and livestock farms are those which could not be classified as either crop farms or livestock farms, but for which the sale of all crops amounted to at least 30 percent but less than 70 percent of the total value of all farm products sold.
Miscellaneous	This group of farms includes those that had 50 percent or more of the total value of products accounted for by sale of horticultural products, or sale of horses, or sale of forest products. In 1950, this group of farms also included those that had 50 percent or more of the total value of farm products accounted for by the sale of fur animals or the sale of bees, wax, and honey.

Farms by tenure of operator.—Farm operators have been classified by tenure on the basis of how they hold the land they operate.

Owners are farm operators who own all or part of the land they operate.

Full owners own all the land they operate.

Part owners own land they operate and rent from others additional land which they operate.

Managers operate farms for others and are paid a wage or salary for their services. Farms operated for institutions or corporations are considered managed.

Tenants rent from others, or work on shares for others, all the land they operate.

Tenants were further classified on the basis of their rental arrangement, as follows:

Cash tenants pay a cash rental, such as $10 per acre, or $1,000 for the use of the whole farm.

Share-cash tenants pay a part of the rent in cash and a part as a share of either the crops or of the livestock or livestock products, or both.

Share tenants pay a share of either the crops or livestock or livestock products, or a share of both. In the South, share tenants with all work power furnished are not included with share tenants but are classed separately as croppers. Share tenants were further classified as:

Crop-share tenants if they paid a share of the crops and no share of the livestock.

Livestock-share tenants if they paid a share of the livestock or livestock products. Livestock-share tenants may or may not also pay a share of the crops.

Croppers are crop-share tenants whose landlords furnish all work power. The landlords either furnish all the work animals or furnish tractor power in lieu of work animals. Croppers usually work under the close supervision of the landlords, or their agents, and the land assigned them is often merely a part of a larger enterprise operated as a single unit.

Farms by class of work power.—Farms have been classified according to kind of work power on the basis of the presence on the farm of horses and/or mules, and tractors. This classification is based on the presence of the sources of work power on the farm, and not on the use or extent of use of various kinds of work power. Many farms do not need work power. Some of these farms represent rural homes with very limited agricultural production. Others are poultry farms, dairy farms, livestock ranches, greenhouses, etc., with little or no cropland. For some farms, all the work power may be furnished by the landlord. Work power was to be reported on the farm where located at the time of the enumeration regardless of ownership. Some farms classified as having work power may have horses or mules kept only for nonfarm work, or for purposes other than for work power. Some farms may have tractors, work power, etc., only for the purpose of performing custom work or furnishing work power to others. Some farms without work power may hire all or part of their work power from others.

Table 1.—Sampling Reliability of the Estimated Number of Farms and Farms Reporting and Estimated Totals for the United States and 5 Areas: Census of 1954

If the estimated number of farms reporting is—	Then the chances are about 2 in 3 that the estimated total would differ from the results of a complete tabulation of the items by less than [1]—
	Percent
1,000	31
2,500	20
5,000	14
10,000	10
25,000	6.3
50,000	4.4
100,000	3.1
250,000	2.0
500,000	1.4

[1] For Tables 14 and 15 the percent error may be obtained by dividing the percent error in this table by 5.

FARM MACHINERY AND FACILITIES

The 168 million people of the United States are better fed and clothed, as a group, than the people of almost any other country. Yet our farm population is only about 22 million, and only 1 worker out of 9 in our entire labor force is engaged chiefly in farming. More than a century ago, in 1830, 7 workers in 10 were engaged in agricultural pursuits. At that time, 1 farmworker produced enough agricultural products for himself and about 3 others. Now, 1 farmer produces agricultural products for himself or herself and almost 19 other persons.

Technological progress has been the compelling force in the large increase in efficiency in agriculture. During the last quarter century physical output in farm production has increased by a half. Each hour of farm labor now produces two and a half times as much farm output as it produced at the conclusion of World War I.

Several phases of farm technology have worked together to increase farm production and to make each hour of direct farm labor more effective. New and better machines, new production, harvesting and marketing methods, and improved arrangements in and around farm service buildings have operated to reduce labor requirements in the production and marketing of crops and livestock. Improved roads, electricity and running water in the home, and other home facilities, have brought the farm nearer to hospitals and trading centers, and have made the farm a better and more comfortable place for living and rearing a family. On the other side of the productivity picture is increased production per acre and per animal because of a host of technical advancements in all of the many phases incident to the raising of crops and livestock.

This report is concerned with that side of technological efficiency that relates to farm power, machinery, and facilities, as portrayed by data released over the years by the Bureau of the Census. For the most part the report deals with the farm situation as it is today with some indications of the future. In some cases, historical changes since 1920 are indicated.

In a way, 1920 may be taken as a starting place from which to measure the beginning of modern farm mechanization. At that time, shortly after the close of World War I, farmers in the United States were just beginning to take the possibilities of using the gas tractor seriously. At the beginning of that year, farmers reported possession of 246,000 tractors (exclusive of steam), compared with 4,692,000 reported on farms in November 1954. Oxen still were being used to some extent in remote areas, and horse and mule numbers had just started their long downward trend from a peak of about 27 million head 2 years earlier, or in 1918. Motortrucks on farms were only one-twentieth as numerous as they are today, but the number of automobiles on farms in 1920 was half the number in 1954.

Grain combines were being used in a limited way but improvements in design and adaptability for smaller farms were yet to come. Mechanical corn pickers were beginning to replace hand picking in the principal corn States. Milking machines were being used in a limited way, primarily by the larger dairymen who had access to electricity. Windmills were being used extensively in the Central and Plains States. Less than 2 percent of the farmers had the benefit of electric power. Today 94 percent of the farms have central-station electric service.

The windmill, without which early settlements in the barren, dry areas of the Plains would not have been possible, has largely passed out of the picture. Year by year, with the coming of electricity to the farm, rural people are installing more refrigerators, freezers, washing machines, water systems, television sets, and other equipment in their homes. The electric light has largely replaced the coal oil lamp in the home, and the lantern in the barns and other service areas. Only in the last 15 years or so has the automatic tie pick-up baler and modern field forage harvester been available to farmers. Electric farm shops, and electrically operated barn cleaners, elevators, blowers, driers, and lifting devices are relatively new on the farm.

The machines and facilities reported on in this report do not cover all details of farm mechanization. Included here are the machines and facilities reported on by the Bureau of the Census—basic machines and facilities around which mechanization has been built. The presentation is organized in five parts, dealing with farm power, harvest machines, farm chore equipment, service equipment, and some results of mechanization.

FARM POWER

Use of mechanical power on farms in the United States had its beginning in the 19th century. Adoption of power machines for fieldwork was at first almost entirely limited to steam tractors. Internal-combustion engines of small size and largely adapted for stationary work only, were first reported at the end of the 19th century. Use of internal-combustion engines as a source of farm power in tractors, trucks, automobiles, and as stationary engines made little headway until the beginning of World War I. Now internal-combustion engines are used in more than 11 million farm motor vehicles, and to some extent as auxiliary mounted engines on heavy equipment, such as grain combines, hay balers, and forage harvesters. Their use as stationary engines for pumping water, grinding feed, and other chore work about the service buildings has decreased as more farms received central-station electricity. This section of the report contains Census graphic material for tractors, automobiles, motortrucks, horses and mules, and farm electricity.

FARM TRACTORS

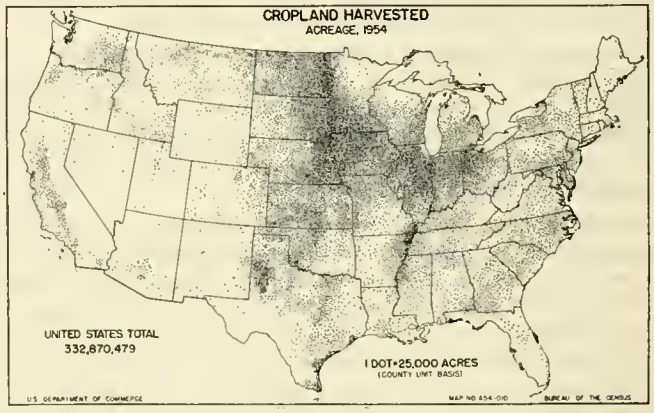
The internal-combustion tractor was first used in farming in the United States shortly before 1910. The early tractors were heavy, crude machines compared with later models. For the most part they were used for performing heavy operations, such as threshing, silo filling, plowing, disking, and harrowing. In many cases they were used at first for belt work and to draw horse and mule implements already available on the farm.

Gradually, tractor design and adaptability for farm jobs were improved. Following introduction of the general purpose tractor in the 1920's, and rubber-tired wheels in the 1930's, tractor numbers and uses increased widely. Old style horse-drawn implements were discarded for more suitable and efficient tractor machines and tools. Improvements in tractor design and in tractor-drawn and mounted machines for fitting land, cultivating and harvesting crops, lifting and moving farm materials and supplies, followed rapidly and continues even today. Recently, more powerful and versatile tractors with improved power take-off units, and tractor-machines have speeded up farmwork in the fields and service areas. Many farm families are now doing the work formerly done with the aid of one or more hired hands. Generally, all kinds of farmwork are being done better and more in season. In many cases the farmer has reduced the average length of many very long work days during rush seasons of the year; he has lessened materially the drudgery which at one time was so evident in farming.

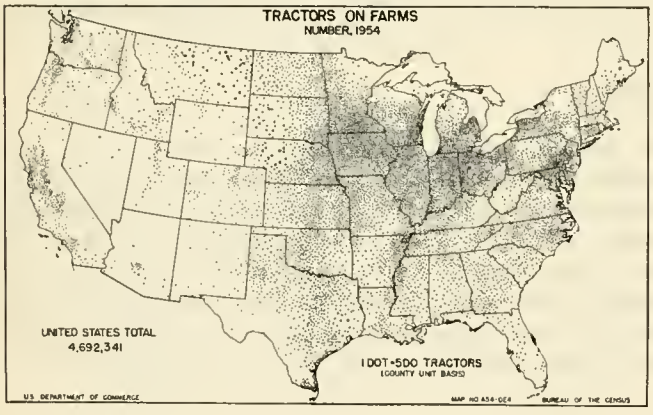
NUMBER OF TRACTORS ON FARMS

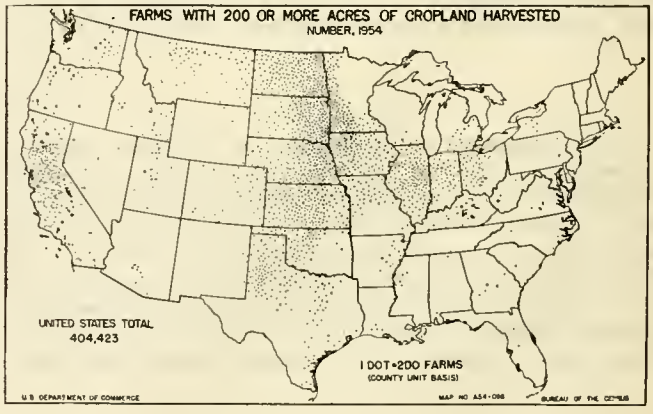
There now are on farms of the United States approximately 4.7 million tractors of all types, sizes, and ages, compared with 246,000 on farms in 1920. And in addition, farmers now have between 150,000 and 200,000 self-propelled machines, most of which are harvest machines. In little more than a third of a century, and in the memory of many farmers of today, mechanical power has almost completely displaced animal power for farming purposes. This displacement has resulted in a decrease in horse and mule numbers on farms from 27 million head in 1918 to less than 4 million head at present. Many of the work animals remaining on farms are used little for farmwork.

Tractor numbers of all types on farms have almost doubled since the last year of World War II (1945). This large increase has taken place even though the level of total agricultural production has increased only moderately. Thus, while total agricultural output has increased since the War by 17 percent, tractor numbers have doubled, increasing from about 2.4 million to 4.7 million. Only a small part of the increase in tractor numbers since 1945 has been caused by loss of work animals. The increase is a part of the general pattern of more fully mechanizing farming operations in the face of rising farm wages, higher value of farm products per acre, and in the general movement throughout all types of industry to reduce labor inputs and excessive drudgery.

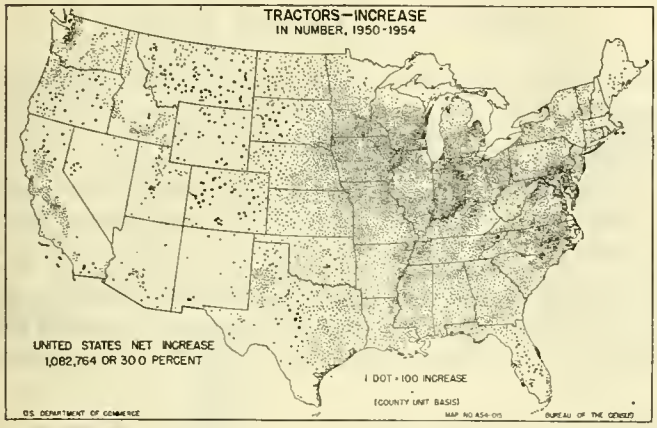


The country distribution of number of tractors in 1954 follows closely the distribution of cropland harvested in 1954. Naturally, the greatest concentration of tractors is in areas where the greatest concentration of crops occurs, as, for example, in the Corn Belt, Lake States, Eastern fruit and vegetable areas, the important cotton areas, and the western irrigated and other crop-growing areas. Tractors are relatively less numerous in the eastern Appalachian region where much of the land is in trees and permanent pastures. In the Western States where mountain and arid acreages are large, and where much of the land is in forests and range pastures, tractor numbers per square mile are exceptionally low.





Although the number of farms in the United States decreased from April 1950 to November 1954 by about 600,000, numbers of tractors of all types actually increased by more than a million.



TYPES OF TRACTORS

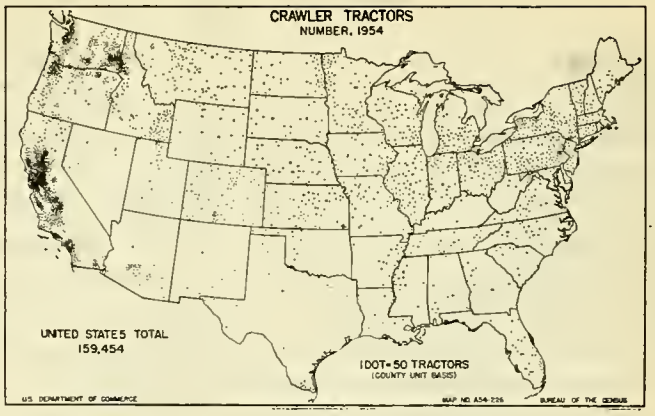
Of the 4.7 million tractors on farms in November 1954, about 89 percent were field wheel type tractors, 3.5 percent were field crawler type tractors, and 7.5 percent were garden type tractors. The field wheel type of tractor so completely dominates the situation so far as numbers are concerned, that the distribution chart for all types gives an equally accurate general view of the distribution of field wheel tractors.

The earliest gas tractors were of the wheel type. They were used almost exclusively for land preparation and belt work. Their use was confined largely to the larger farms, primarily in the Great Plains and Western States. Gradually, newer models were developed which were suitable for farms which were smaller than the large sizes, located in most areas of the United States.

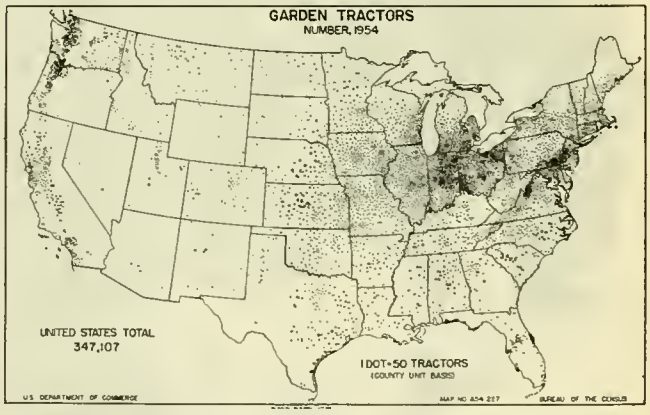
With the development of the general purpose wheel tractor in the 1920's, use of wheel tractors spread rapidly in all areas, especially in those areas where row crops are grown. The general purpose tractor, as the name implies, is used for many kinds of farmwork, including crop cultivation and other row crop work. Introduction of rubber tires in the 1930's, and development of wheel tractors suitable for the smaller family sized farms as well as for the larger farms speeded up the change from animal to mechanical power.

The crawler type of tractor has an endless beltlike type of track on which it operates as it moves over the terrain. This type of tractor probably was first used for farmwork along about 1910. Although the number of crawler tractors on farms is small, compared with the number of wheel tractors, it has a distinct place under some farming conditions. It is well suited for pulling heavy loads, especially where the ground is soft or steep. Because of construction some models can be operated under overhanging limbs of trees and close to tree trunks. This feature makes it well suited for cultural operations and other work in commercial orchards.

Although crawler tractors are used to some extent in all areas, their number is greatest in the Pacific Coast States and in Idaho. About 55 percent of all crawler tractors on farms in 1954 were in the Mountain and Pacific States. They are used extensively in the principal fruit and truck areas of Washington, Oregon, and California, and in the wheat area of eastern Washington, northern Idaho, and central Oregon.



Garden tractors, as the name implies, generally are used to cultivate small acreages of vegetables and other garden crops. They were first reported by the Census of Agriculture in 1945, although some garden tractors were used on farms as early as 1940 or 1941. Their use has expanded rapidly. The number on farms has increased from 68,000 in 1945 to 347,000 in November 1954. Concentration of garden tractors is particularly heavy in the Corn Belt and Eastern States, and in the western part of the Pacific Coast States. More than half of those reported



in 1954 were in the Corn Belt and Northeastern States, 10 percent were in the Appalachian States and 11 percent were in the Pacific Coast States. Many commercial farms have garden tractors for cultivating the home garden and truck patch.

NUMBERS OF FIELD WHEEL, CRAWLER, AND GARDEN TRACTORS ON FARMS BY FARM-PRODUCTION AREAS, NOVEMBER 1954

Area	Field wheel		Crawler		Garden	
	Number (000)	Percent distribution	Number (000)	Percent distribution	Number (000)	Percent distribution
Northeast	382.3	9.1	16.5	10.3	59.3	17.1
Corn Belt	1,091.6	26.1	14.0	8.7	118.7	34.2
Lake States	619.2	14.8	10.8	6.8	37.4	10.8
Northern Plains	540.8	13.0	9.3	5.8	15.4	4.4
Appalachian	365.6	8.8	6.4	4.0	34.6	10.0
Southeast	219.1	5.2	6.0	3.1	10.3	3.0
Delta States	205.8	4.9	3.7	2.3	7.3	2.0
Southern Plains	365.1	8.7	5.6	3.4	12.9	3.7
Mountain	214.4	5.1	22.1	13.9	11.9	3.4
Pacific	181.5	4.3	66.6	41.7	39.1	11.3
United States	4,185.0	100.0	159.9	100.0	346.9	100.0

FARMS REPORTING TRACTORS

Although agriculture in the United States is highly mechanized, only about 60 percent of our 4.8 million farms reported tractors in November 1954. For the most part, those reporting tractors are the farms that are most suitable for some degree of modern mechanization and that actually need mechanical field power. They are the farms that produce a very large part of total agricultural production. The actual agricultural output on farms not having tractors is not available. Census data for 1954 do show, however, that 40 percent of all farms produced less than $1,200 worth of products for sale in 1954. As a group, this 40 percent of the farms produced only 3.4 percent of the total value of products sold in that year. Less than one-third of these low production farms reported tractors in 1954.

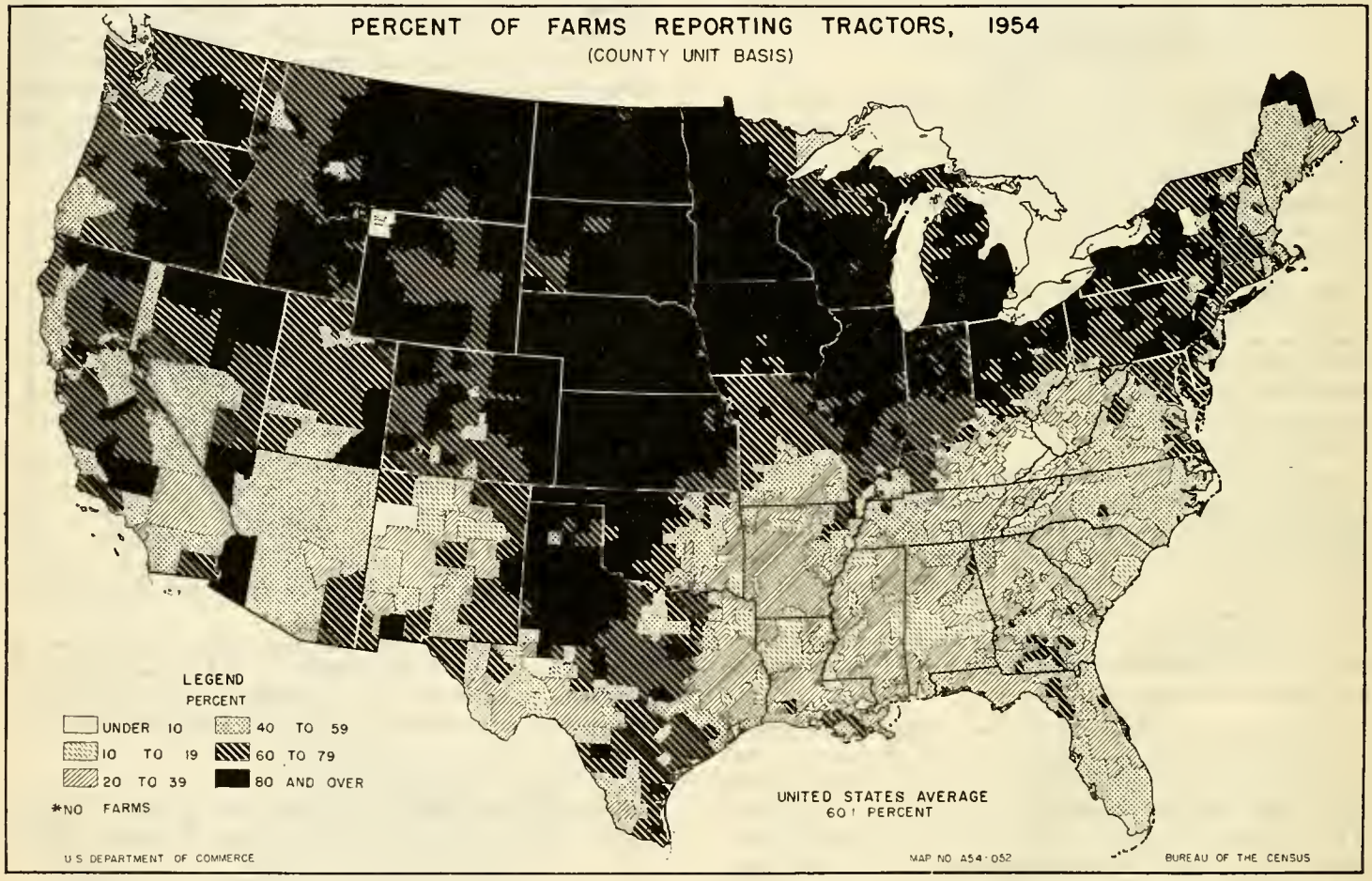
The largest percentage of farms that reported tractors in 1954 is in the northern and central farming areas, and the smallest percentage is in the Southeastern States. From 60 to 80 percent of the farm units in most of the northern and central areas apparently are of a size and type suitable for some degree of mechanization, and, therefore, suitable for individual ownership of tractor power and equipment. In the Southeastern States less than 40 percent of the farms in many of the counties reported tractors.

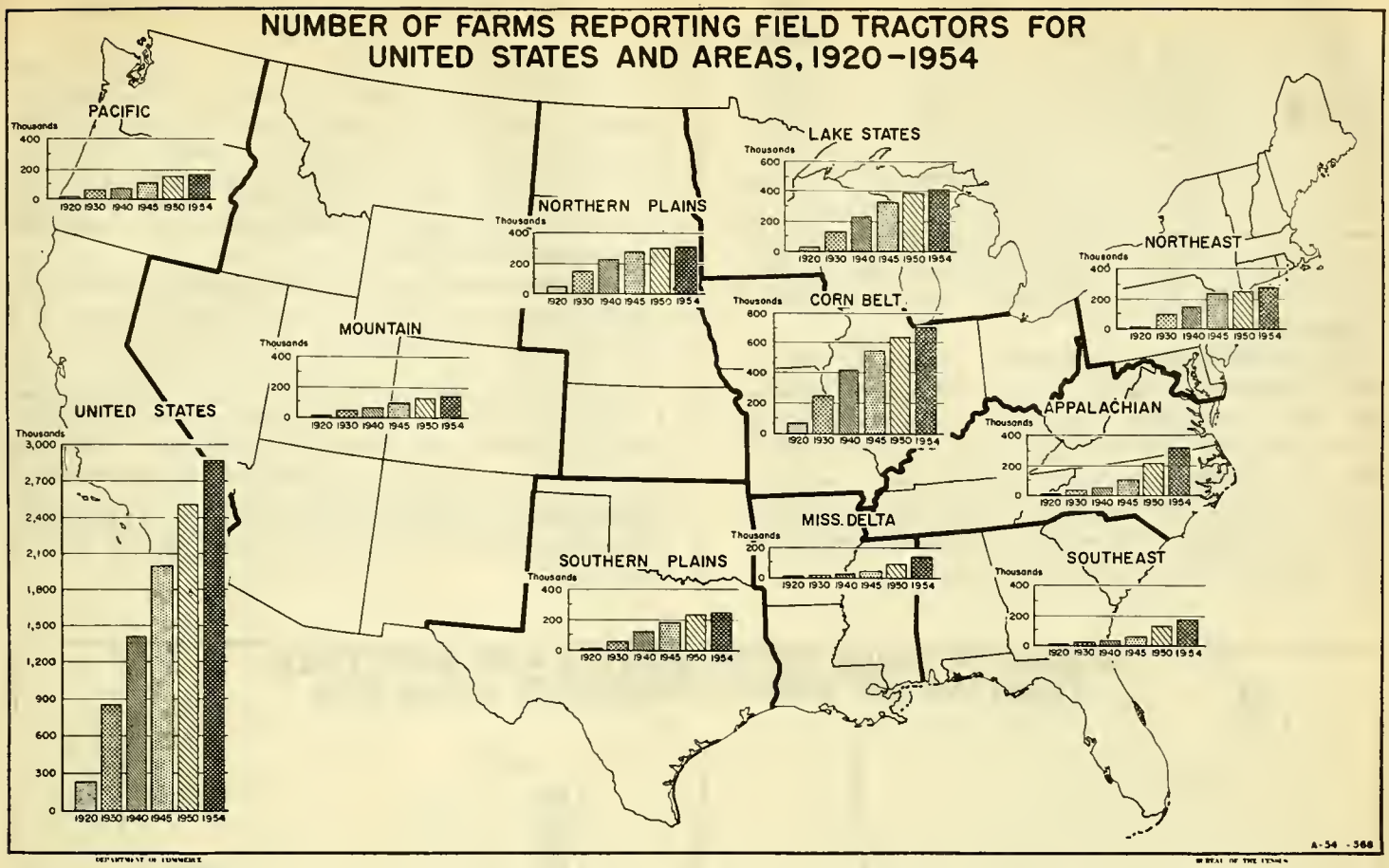
The fact that a farmer does not have a tractor does not mean that he does not use tractor power. Custom operators, many of whom are farmers, are available in all sections for preparing land, tending crops, and for performing harvesting operations. Sharecropper farms in the South are operated with equipment owned by the "home farm." Many fruit farmers in some areas hire all or a part of their field work done. Operators of greenhouses and some commercial poultry enterprises who cultivate no land may have no reason to own field tractors. On many such farms, motortrucks may represent the important motive power unit.

GROWTH OF TRACTOR POWER

It is not surprising that in the beginning, farmers' unqualified acceptance of the farm tractor was slow to develop. The limited capacity of the early tractor to do various types of farmwork meant that few work animals were disposed of when a tractor was bought. Even after tractor models and tractor-drawn equipment were greatly improved, many jobs still were done by horses and mules. In the severe depression of the 1930's, cash with which to buy gasoline, oil, and repairs was very limited. But farmers could produce their own power in the form of corn, oats, and hay, at little cash cost. In many instances, jobs which had been done with tractor power were again done with animal power and equipment and the tractors remained idle. Even after more versatile tractors were developed and farm economic conditions began to improve, many farmers felt obliged to keep a well-shod team or two for work in icy and muddy places. Pioneering farmers led the way in complete displacement of work stock with tractors. The movement grew rapidly from the beginning of World War II. Few commercial farmers now depend on work stock for doing field work.

The increase between 1920 and 1954 in number of farms reporting tractors was 2,648,000. About 24 percent of this increase occurred between 1920 and 1930, 21 percent occurred between 1930 and 1940, 42 percent occurred between 1940 and 1950, and 13 percent since 1950.




NUMBER OF FARMS REPORTING FIELD TRACTORS FOR UNITED STATES AND AREAS, 1920–1954
PACIFIC
LAKE STATES
NORTHERN PLAINS
NORTHEAST
CORN BELT
MOUNTAIN
APPALACHIAN
UNITED STATES
MISS. DELTA
SOUTHERN PLAINS
SOUTHEAST
Thousands
1920 1930 1940 1945 1950 1954
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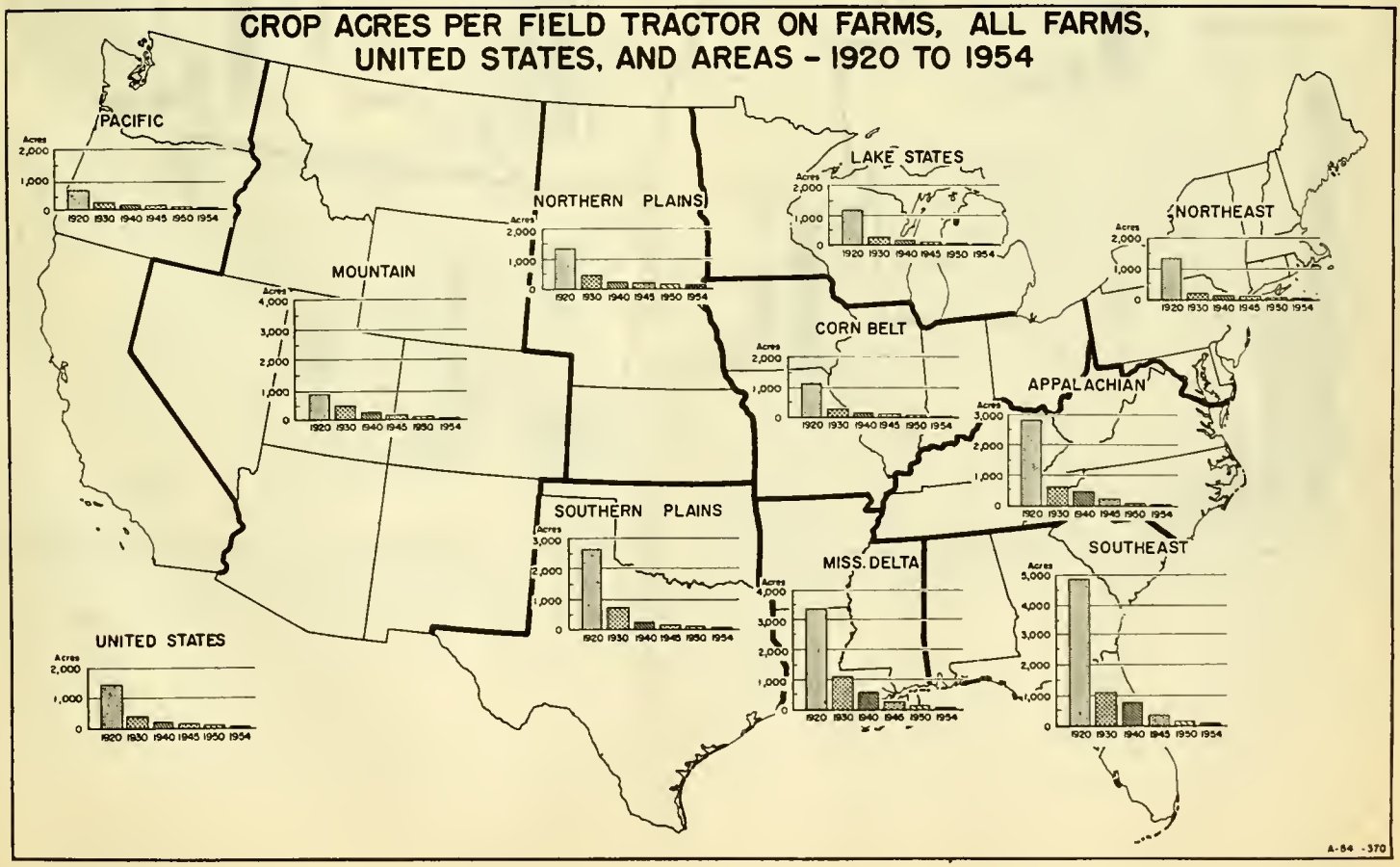
CROP ACRES PER FIELD TRACTOR ON FARMS, ALL FARMS, UNITED STATES, AND AREAS - 1920 TO 1954
PACIFIC
LAKE STATES
NORTHERN PLAINS
NORTHEAST
MOUNTAIN
CORN BELT
APPALACHIAN
SOUTHERN PLAINS
SOUTHEAST
MISS. DELTA
UNITED STATES
Acres
1920 1930 1940 1945 1950 1954
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In 1954, almost 58 percent of all farms reporting field tractors were in the Corn Belt, Lake, and Great Plains States, distributed as follows: Corn Belt, 24.4 percent; Lake States, 14 percent; Northern and Southern Plains States, 19.3 percent. It was in these areas that farmers bought tractors most rapidly in the early days of farm mechanization. It is in these States and in the Northeast area where number of farms reporting tractors has increased considerably less than average during the last 10 years. The greatest relative increase in farms reporting tractors during the last 10 years has been in the Appalachian, Southeast, and Mississippi Delta areas, where mechanization was relatively slow in getting started.

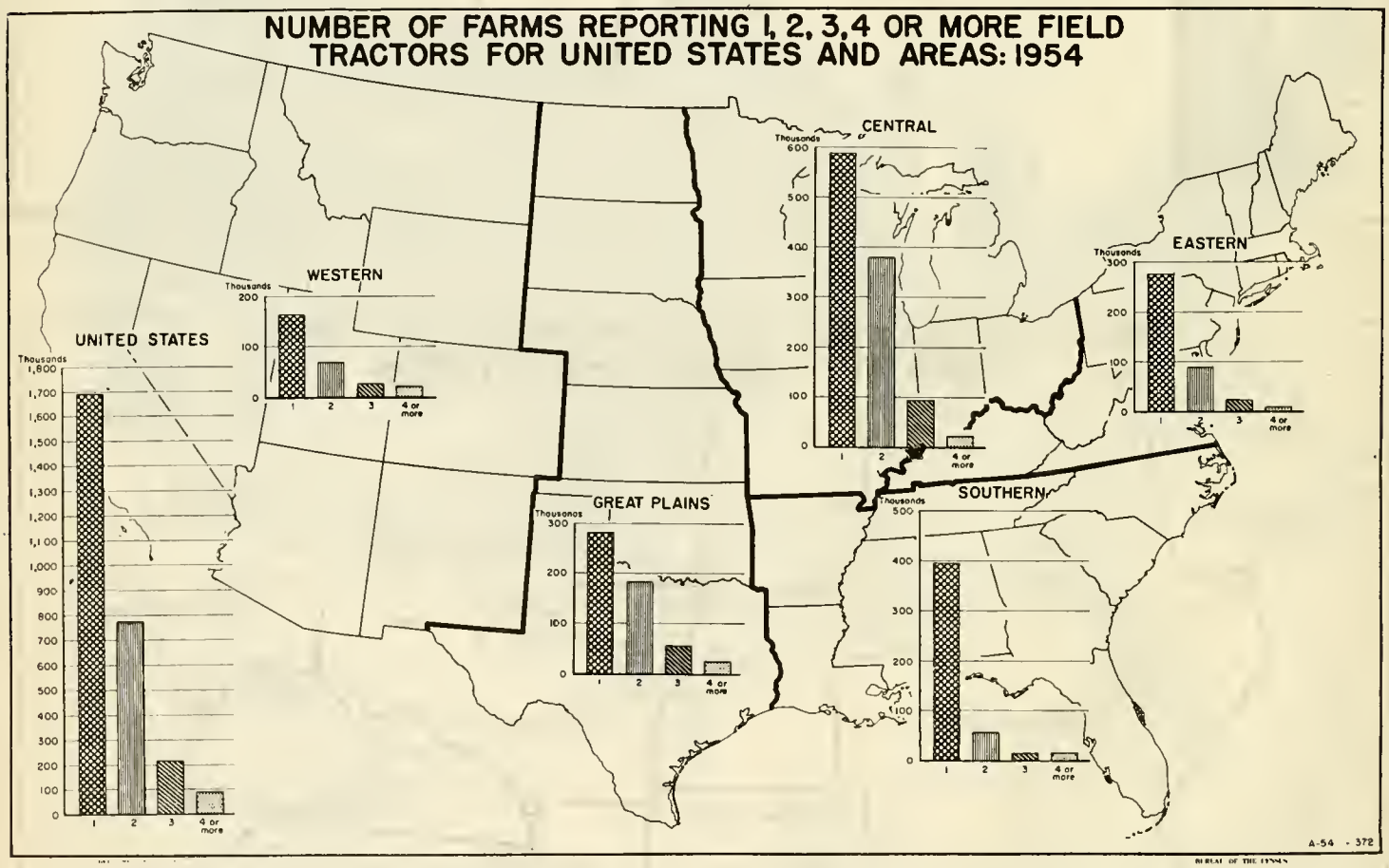
Although the number of field tractors on farms in 1954 is 18 times the number in 1920, the number of crop acres has changed very little. Consequently, total crop acres per field tractor decreased during the period from 1,417 to 71, or by almost twenty-fold. The downward trend has been pronounced in each of the 10 areas shown in the map. In November 1954, the smallest average crop acres per field tractor was 35.5 in the Northeast and the largest was 140.1 in the Northern Plains States.

FARMS REPORTING ONE OR MORE FIELD TRACTORS

As farmers became more dependent on tractor power and tractor-drawn and tractor-mounted equipment, many bought a second or a third tractor. Consolidation of farms into larger operating units also helped to increase the average number of tractors per farm. In the early days of tractor use, few farms had more than one tractor. As late as 1940 the average number of field tractors per farm reporting tractors was 1.1. By 1954 the average had risen to 1.6.

In November 1954, 61 percent of the 2.8 million farms reporting field tractors reported one tractor, 28 percent reported 2, 8 percent reported 3, and 3 percent reported having 4 or more tractors.

Regionally, the largest percentage of tractor farms reporting 4 or more field tractors per farm in 1954 was in the Western States (7 percent), and the second largest was in the Great Plains States (4.4 percent). A relatively large proportion of the farms reporting only one field tractor each was in the Southern States (82 percent), followed in rank by the Eastern States where 69 percent of the tractor farms reported only one tractor each.



FIELD TRACTORS BY SIZE OF FARM

Many farms, small in terms of acreage, are difficult to mechanize economically. This is particularly true of those that are general in type and have low incomes: Many small fruit and vegetable farms, and other types having intensive production enterprises require much field work per acre and are economically suitable for tractor power and tractor equipment. Many small part-time farms are effectively equipped with tractors and tractor equipment. Although the machinery investment per acre for part-time farms may appear unreasonably high, from the standpoint of income both on and off the farm it may be quite reasonable.

In 1954 more than a third of all farms in the United States were under 50 acres in size. This group had 11 percent of all the tractors reported that year. At the other end of the scale, farms of 500 or more acres represented 6.7 percent of all farms and had 17.2 percent of the total number of field tractors. Almost 60 percent of all field tractors reported were on farms having from 100 to 499 acres.

Small farmers reported field tractors in all regions. Field tractors were relatively numerous on small farms in the Southern and Western States, and relatively numerous on large farms in the Great Plains and Western States.

FIELD TRACTORS BY TENURE OF OPERATOR

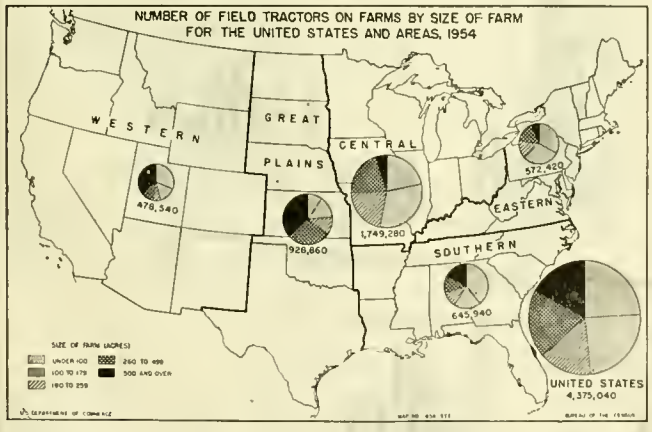
Farm owners, part owners, and farm managers operated 76 percent of all farms in 1954, and tenants of all classes operated 24 percent. The share tenant and cropper group represented 62 percent of all tenants. Within each tenure group are both small and large farms. Farmers in each group have access to custom operators for major field operations.

NUMBER OF FARMS REPORTING TRACTORS AND AVERAGE NUMBER OF TRACTORS PER FARM, BY TENURE, UNITED STATES: 1954

Tenure	Farms reporting tenure		Percentage reporting tractors	Average number of tractors per farm reporting
	Number	Percent distribution		
Full owners	2,760,840	57.4	52.7	1.4
Part owners	871,780	18.1	80.3	1.8
Managers	22,220	0.5	80.9	3.4
All tenants	1,150,860	23.9	53.1	1.6
Cash tenants	159,500	3.3	45.7	1.6
Share-cash tenants	165,000	3.4	92.2	1.8
Share tenants and croppers	716,700	14.9	47.9	1.6
Other and unspecified tenants	109,660	2.3	38.7	1.5
Total	4,805,700	100.0	57.9	1.6

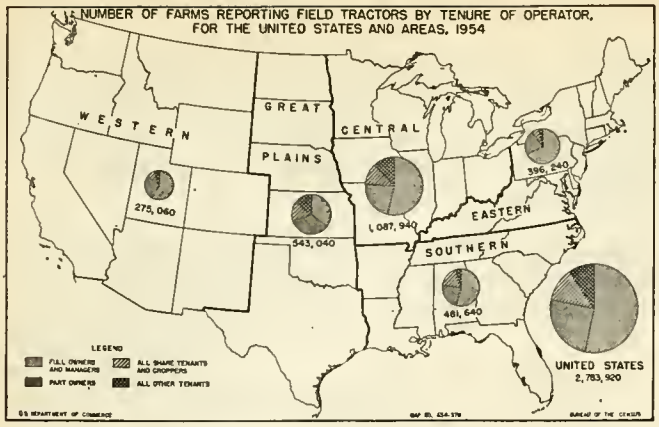
PERCENTAGE DISTRIBUTION OF NUMBER OF FARMS AND NUMBER OF FIELD TRACTORS, BY SIZE OF FARM, FOR UNITED STATES AND AREAS: 1954

Size of farm (total acres)	United States		Area									
			Eastern		Southern		Central		Great Plains		Western	
	Farms	Tractors	Farms	Tractors	Farms	Tractors	Farms	Tractors	Farms	Tractors	Farms	Tractors
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Under 50 acres	35.6	10.7	38.3	14.0	53.0	18.8	21.0	7.9	18.5	3.9	46.4	19.6
50 to 99 acres	18.0	13.4	22.2	18.6	21.4	20.7	18.3	13.7	10.5	5.3	11.4	11.4
100 to 179 acres	19.8	24.3	22.2	30.8	13.3	20.0	29.5	31.5	17.4	14.2	12.0	15.4
180 to 259 acres	9.8	15.2	8.3	14.0	5.2	10.9	16.4	21.3	11.2	11.8	4.4	6.9
260 to 499 acres	10.1	19.2	6.9	15.8	4.3	11.8	12.6	20.5	22.0	28.1	7.5	11.4
500 to 999 acres	4.0	8.2	1.6	4.6	1.9	9.6	1.9	4.1	12.7	15.8	6.6	11.1
1,000 acres and over	2.7	9.0	0.4	2.2	1.0	8.2	0.3	1.0	7.8	20.9	11.7	24.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0



The owner group contains a large number of small farms, many of which are low-income places, and many of which are part-time farms for families who work off the farm. Because of the large number of small units in this group it is not surprising that only 53 percent of such farms reported one or more tractors in 1954. Part-owner farms are owned farms with additional rented land. Renting additional land is one way of increasing size of farm and making the unit more suitable for tractor power and tractor equipment. More than 80 percent of the farms in this group reported having tractors in 1954. Full-owner and part-owner farms are important tenure types in all regions of the United States.

Manager and share-cash tenant farms are found in a limited way in each of the five areas shown, and tend to be larger than average in size. A high percentage of farms in each of these groups reported tractors in 1954. Share tenants and croppers are important groups in all regions. Many farms of these types of tenure are small in size. In 1954 less than half reported tractors.



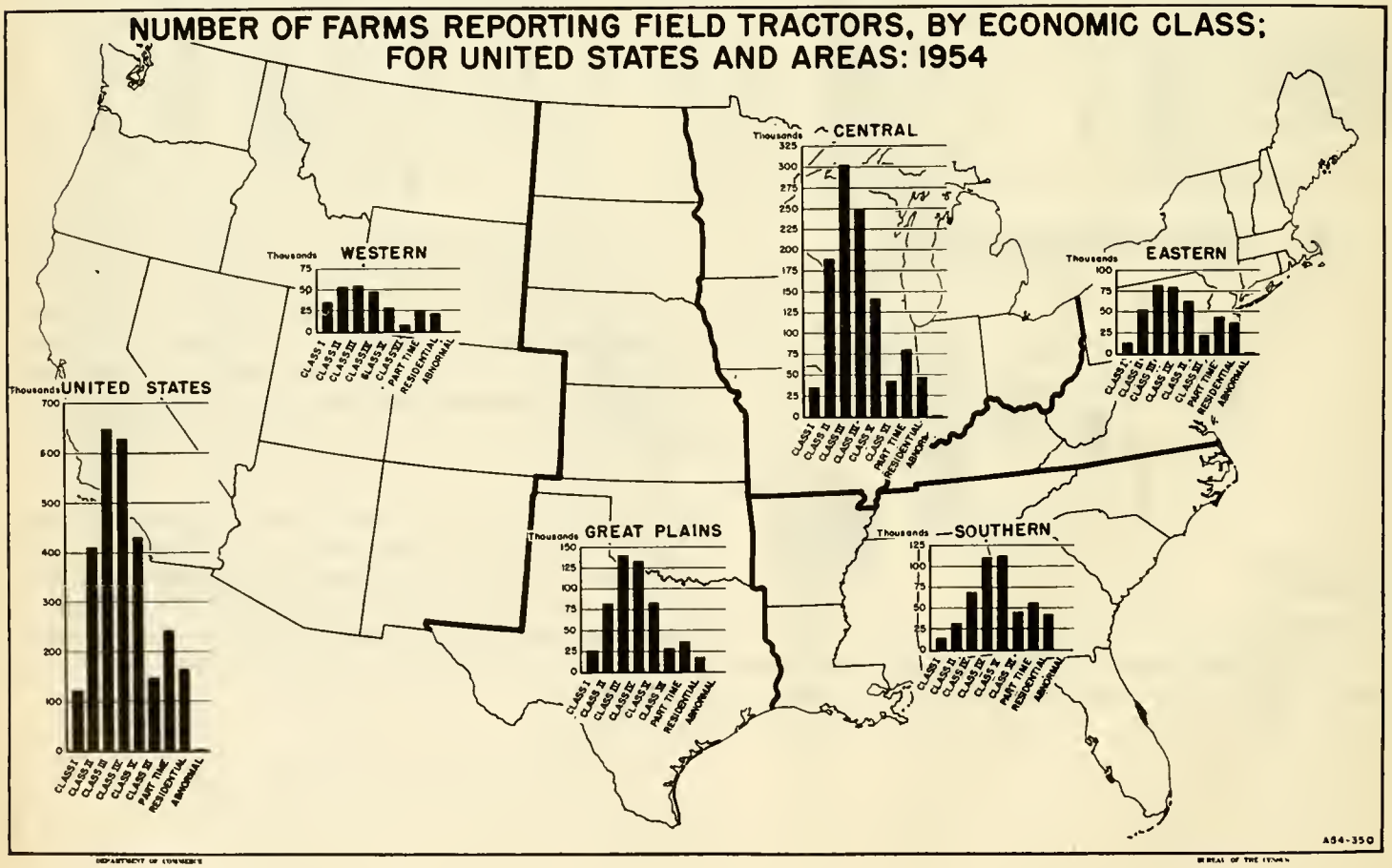
FARMS REPORTING FIELD TRACTORS, BY ECONOMIC CLASS OF FARM

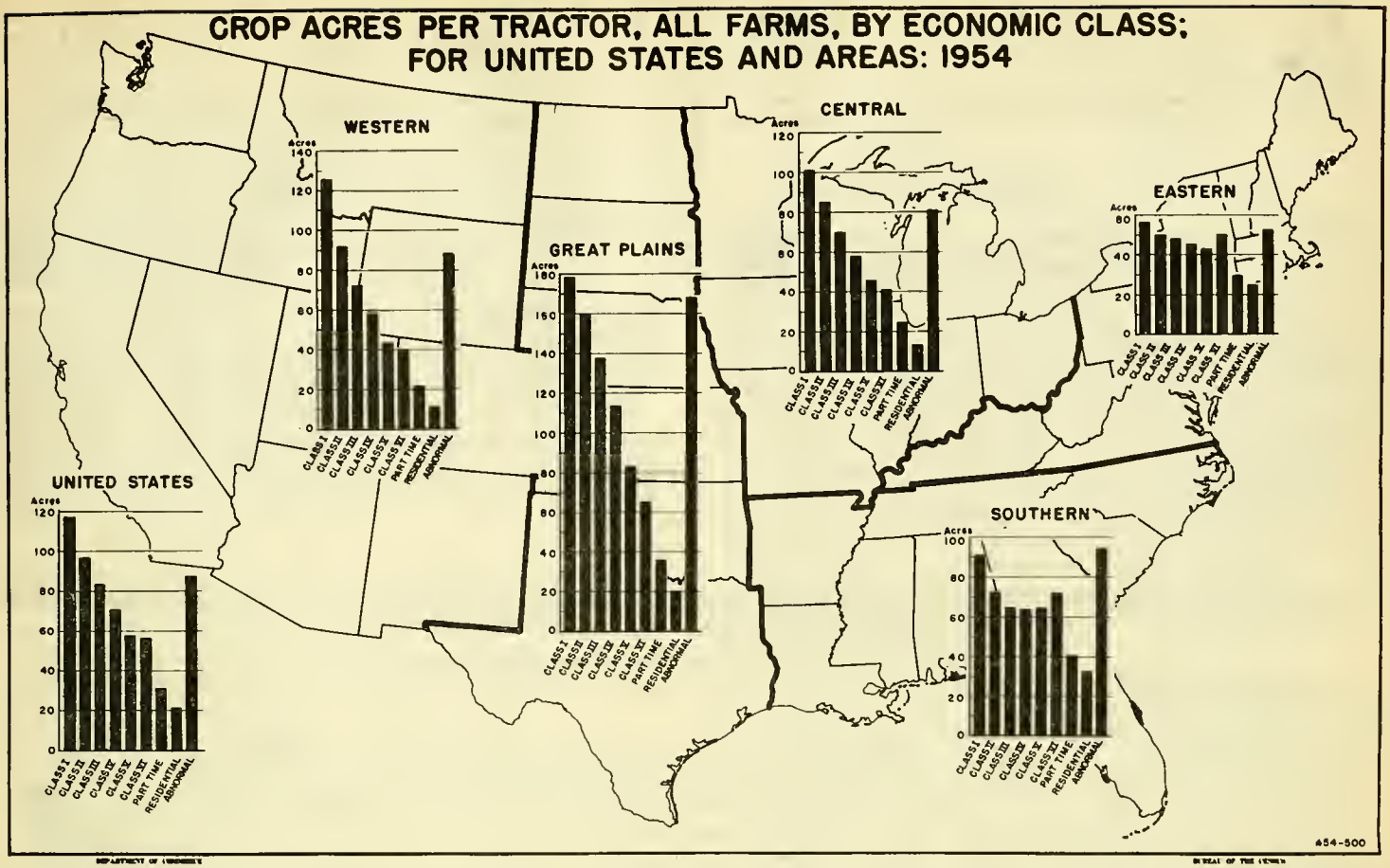
Generally, the volume of tractors and other farm machinery bought by farmers is closely related to farm cash receipts and size of farm operation. Individually, and by groups, the larger the cash sales are, the more need farm operators have for the more expensive types of machines and equipment, and the better able they are financially to fully equip their farms.

About 85 percent of all commercial farmers in Economic Classes I, II, III, and IV in 1954 reported one or more field tractors. These were the farmers whose products sold ranged from $2,500 to more than $25,000 per farm. This group made up less than half of all farms in 1954. Of the remaining commercial farms, less than half reported tractors in 1954. Many of these low-income operators sold less than $1,000 worth of products in that year. Few of them worked off the farm as much as 100 days. Only 28 percent of the 1.5 million noncommercial farms reported field tractors in 1954. Regionally, a relatively large proportion of the farmers reporting tractors that are in the higher economic classes are in the Western, Central, and Great Plains States. Large proportions of the residential and part-time farmers that reported tractors in 1954 are in the Eastern and Southern States.

FARMS REPORTING TRACTORS, AVERAGE NUMBER OF TRACTORS PER FARM REPORTING, AND AVERAGE CROP ACRES PER TRACTOR, BY ECONOMIC CLASS OF FARM: 1954

Economic class of farm	All farms (000)	Farms reporting tractors		Average number of tractors per farm reporting	Average crop acres per tractor
		Number (000)	Percent of all farms		
Commercial farms:					
Class I	135.5	122.5	90.4	3.4	117.1
Class II	442.8	409.7	92.5	2.2	96.4
Class III	726.3	648.4	89.3	1.6	83.2
Class IV	821.1	620.1	75.5	1.4	70.5
Class V	769.1	430.2	55.9	1.2	57.2
Class VI	457.7	145.7	31.8	1.2	56.4
Commercial farms, total	3,352.5	2,376.6	70.9	1.6	82.4
Other farms:					
Part-time	575.6	241.1	41.9	1.1	30.7
Residential	874.6	164.4	18.8	1.1	21.2
Abnormal	3.0	1.9	61.6	4.3	87.1
Other farms, total	1,453.2	407.4	28.0	1.1	28.0
United States, total	4,805.7	2,784.0	57.9	1.6	76.9





Closely related to the proportion of farmers in each economic class that reported tractors, are average number of tractors per farm and average crop acres per tractor. For example, farms with tractors in the Economic Class I group had an average of 3.4 tractors per farm and those in Economic Class VI had an average of only 1.2 tractors per farm reporting tractors. The abnormal farms reporting tractors had the highest average number per farm, and the residential and part-time farms had the lowest average number per farm reporting. Crop acres per tractor, based on all crop acres in each economic class, was highest (117) in Economic Class I, and lowest (21) in the residential group. Generally, when the farms were grouped by economic class the crop acres per tractor declined as sales per farm decreased. This relationship was less evident in the Eastern and Southern States than it was in the other three regions.

Table 2.—Number of Farms, Average Size of Farm, and Farms Reporting Specified Number of Tractors, for the United States and Areas: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Item	United States	Area				
		Eastern	Southern	Central	Great Plains	Western
All farms—number (000)	4,806	779	1,477	1,366	761	423
Average size of farm—acres	242.2	110.5	109.1	153.9	482.9	798.2
Farms reporting tractors—farms (000)	2,784	396	482	1,088	543	275
Percentage of farms reporting by number of tractors reported:						
No tractors—percent	42.1	49.1	67.4	20.4	28.7	35.0
1 tractor—percent	35.4	35.1	26.7	43.0	37.0	38.4
2 tractors—percent	16.1	11.4	3.8	27.6	24.0	16.2
3 tractors—percent	4.5	3.0	1.1	7.0	7.2	6.1
4 or more tractors—percent	1.9	1.3	1.0	1.8	3.2	4.4

Table 3.—Number of Farms, and Farms Reporting and Number of Field Tractors, by Size of Farm, for the United States: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Size of farm	All farms		Field tractors				
			Farms reporting		Number of tractors		
	Number (000)	Percent distribution	Number (000)	Percent of all farms	Total (000)	Average number per farm (all farms)	Average number per farm reporting
Total	4,806	100.0	2,784	57.9	4,375	0.9	1.6
Under 10 acres	489	10.2	61	12.5	66	.1	1.0
10 to 29 acres	719	15.0	174	24.3	192	.3	1.1
30 to 49 acres	497	10.4	190	38.2	212	.4	1.1
50 to 69 acres	348	7.2	163	46.8	185	.5	1.1
70 to 99 acres	519	10.8	322	62.0	399	.8	1.2
100 to 139 acres	492	10.2	358	72.8	487	1.0	1.4
140 to 179 acres	463	9.6	388	83.7	576	1.2	1.5
180 to 219 acres	259	5.4	220	84.7	351	1.4	1.5
220 to 259 acres	210	4.4	183	87.2	314	1.5	1.7
260 to 499 acres	488	10.2	434	89.0	841	1.7	1.9
500 to 999 acres	191	4.0	176	92.1	358	1.9	2.0
1,000 acres and over	131	2.7	115	87.7	394	3.0	3.4

Table 4.—Number of Farms, and Farms Reporting and Number of Field Tractors, by Tenure of Operator, for the United States: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Tenure of operator	All farms		Field tractors				
			Farms reporting		Number of tractors		
	Number (000)	Percent distribution	Number (000)	Percent of all farms	Total (000)	Average number per farm (all farms)	Average number per farm reporting
Total	4,806	100.0	2,784	57.9	4,345	0.9	1.6
Full owners	2,761	57.4	1,455	52.7	2,022	.7	1.4
Part owners	872	18.1	700	80.3	1,269	1.5	1.8
Managers	22	.5	18	80.9	61	2.7	3.4
All tenants	1,151	23.9	611	53.1	992	.9	1.6
Cash tenants	160	3.3	73	45.7	114	.7	1.6
Share-cash tenants	165	3.4	152	92.2	269	1.6	1.8
Share tenants and croppers	717	14.9	343	47.9	546	.8	1.6
Other and unspecified tenants	110	2.3	42	38.7	64	.6	1.5

Table 5.—Number of Farms, and Farms Reporting and Number of Field Tractors, by Economic Class of Farm, for the United States: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Economic class of farm	All farms		Field tractors				
			Farms reporting		Number of tractors		
	Number (000)	Percent distribution	Number (000)	Percent of all farms	Total (000)	Average number per farm (all farms)	Average number per farm reporting
Total	4,806	100.0	2,784	57.9	4,345	0.9	1.6
Commercial farms	3,352	69.8	2,377	70.9	3,895	1.2	1.6
Class I	136	2.8	122	90.4	418	3.1	3.4
Class II	443	9.2	410	92.5	896	2.0	2.2
Class III	726	15.1	648	89.3	1,059	1.5	1.6
Class IV	821	17.1	620	75.5	839	1.0	1.4
Class V	769	16.0	430	55.9	513	.7	1.2
Class VI	458	9.5	146	31.8	169	.4	1.2
Other farms	1,453	30.2	407	28.0	450	.3	1.1

Table 6.—PERCENT DISTRIBUTION OF ALL FARMS, AND NUMBER OF FIELD TRACTORS, BY ECONOMIC CLASS OF FARM, FOR THE UNITED STATES AND AREAS: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Economic class of farm	United States		Area									
	All farms	Field tractors	Eastern		Southern		Central		Great Plains		Western	
			All farms	Field tractors	All farms	Field tractors	All farms	Field tractors	All farms	Field tractors	All farms	Field tractors
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Commercial farms	69.8	89.6	61.2	83.9	62.2	82.8	79.8	92.0	75.4	93.5	69.2	89.7
Class I	2.8	9.6	2.2	7.9	1.1	9.7	2.7	6.1	3.5	8.9	9.1	25.5
Class II	9.2	20.6	8.0	19.9	2.7	10.2	14.1	24.2	11.3	20.7	14.7	22.5
Class III	15.1	24.4	12.2	21.7	6.7	14.7	23.1	28.9	19.6	27.3	15.7	18.5
Class IV	17.1	19.3	14.1	18.0	15.4	21.1	20.0	19.7	19.4	21.6	14.8	12.8
Class V	16.0	11.8	15.0	12.2	21.2	19.0	13.7	10.3	13.8	11.4	10.9	8.0
Class VI	9.5	3.9	9.7	4.2	15.0	8.2	6.1	2.8	7.9	3.6	4.0	2.4
Other farms	30.2	10.4	38.8	16.1	37.8	17.2	20.2	8.0	24.6	6.5	30.8	10.3

Table 7.—PERCENT DISTRIBUTION OF ALL FARMS, AND NUMBER OF FIELD TRACTORS, BY TENURE OF OPERATOR, FOR THE UNITED STATES AND AREAS: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Tenure of operator	United States		Area									
	All farms	Field tractors	Eastern		Southern		Central		Great Plains		Western	
			All farms	Field tractors	All farms	Field tractors	All farms	Field tractors	All farms	Field tractors	All farms	Field tractors
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Full owners	57.4	46.5	72.6	62.3	52.7	48.3	58.8	48.1	43.4	31.7	67.1	48.3
Part owners	18.1	29.2	14.7	25.5	13.2	26.8	19.0	24.8	28.5	39.3	20.2	33.5
Managers	0.5	1.4	0.5	1.7	0.4	2.9	0.3	0.7	0.5	0.9	1.0	2.9
All tenants	23.9	22.8	12.3	10.5	33.7	22.1	21.9	26.4	27.6	28.2	11.7	15.2
Cash tenants	3.3	2.6	2.3	2.2	3.7	2.7	3.1	2.8	4.1	2.2	3.2	3.0
Share-cash tenants	3.4	6.2	0.4	0.6	0.5	1.0	6.5	9.0	8.0	10.3	1.1	1.9
Share tenants and croppers	14.9	12.6	7.6	6.2	26.6	16.3	10.3	13.2	12.9	14.4	5.8	9.2
Other and unspecified tenants	2.3	1.5	2.0	1.5	2.9	2.0	1.9	1.4	2.5	1.4	1.6	1.2

AUTOMOBILES ON FARMS

The first automobiles used on farms bore little resemblance to those of today. Relatively little horsepower was developed by the engines which were started manually with a crank. Tires consisted of a fabric body covered with a thin layer of rubber. They required frequent repair and had a short life. In many areas, especially in the Northern States, use of early automobiles was confined largely to the summer months because of bad roads and hard starting. Under most conditions, however, travel time was reduced greatly over travel by use of horses or mules.

By 1920, there were 2,146,000 automobiles on farms, or an average of 1 car for each 3 farms. Few farmers had trucks at that time and the automobile was used for hauling farm produce and supplies as well as for pleasure. Rural travel by automobile was largely over unsurfaced roads because in 1920 only 13 percent of the rural roads were hard-surfaced.

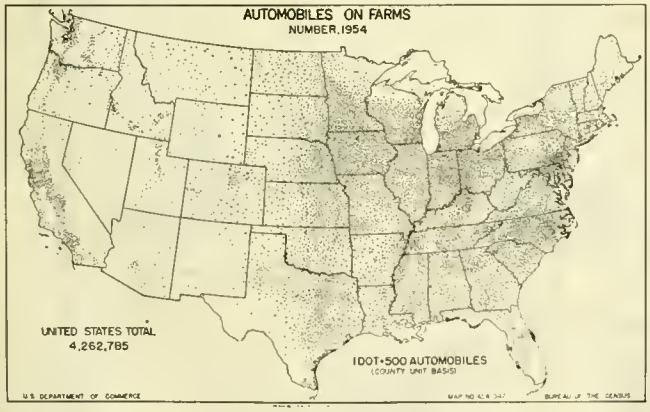
By 1930, many improvements had been made in automobiles and automobile tires. The mileage of improved roads had increased, and the number of automobiles on farms was nearly double the number reported in 1920.

From 1930 to 1954 the number of automobiles on farms increased only 128,000 making a total of 4,263,000 in November 1954. At that time, there was an average of one automobile for each 1.1 farms, but many farms had more than 1.

Although the increase in automobile numbers between 1930 and 1954 was small, it did occur while the number of farms was decreasing from 6.3 million to 4.8 million.

Rural highway improvement continued steadily and by 1954, 63 percent of the mileage was hard-surfaced. Truck numbers on farms have increased, but automobiles still are used to some extent to pull trailers and for hauling small amounts of produce and supplies.

The 4,263,000 automobiles on farms in 1954 were distributed over the country in varying degrees of concentration. Heavy concentrations were evident in States where a high percentage of the land was used for crop production and where farm homes were concentrated. Comparatively few automobiles were reported in much of the western Plains and Mountain regions where ranches and farms are large, and in localized eastern and southern areas where farm population is sparse.



The four Corn Belt States, Indiana, Iowa, Illinois, and Ohio, have a remarkably even distribution and a heavy concentration of automobiles. In Nevada, Arizona, and New Mexico relatively few farm automobiles were reported in 1954.

FARMS REPORTING AUTOMOBILES

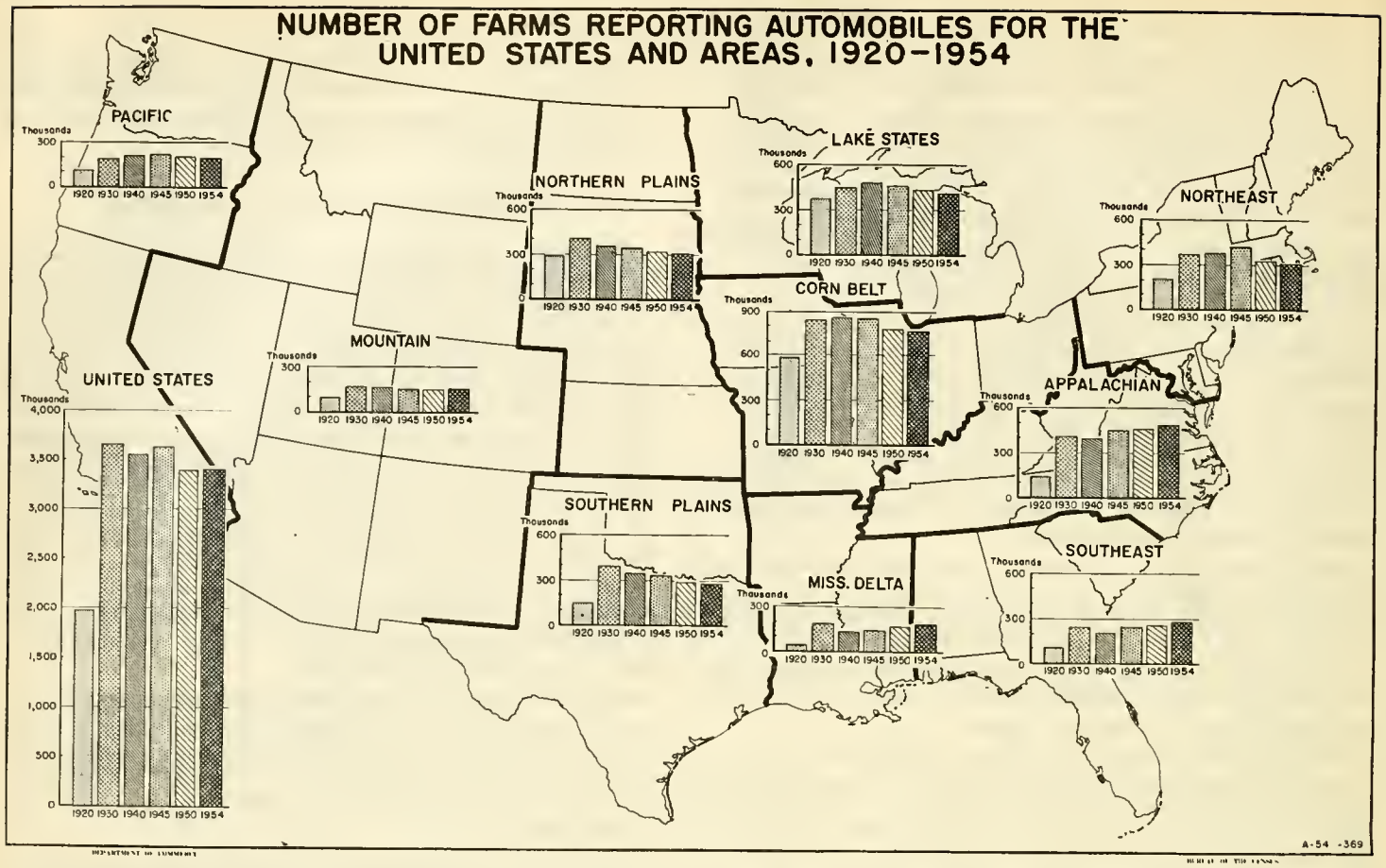
The number of farms in the United States reporting automobiles has increased and declined during several Census periods, due to several factors. The period 1920 to 1930 was the only period in which a really large increase occurred. Farm incomes were good in the latter half of the decade and the number of farms with automobiles increased rapidly. The low-income years in the first half of the decade between 1930 and 1940, along with some reduction in the number of farms caused a decline during that period in the number of farms with automobiles. With farm incomes rising after 1940, and despite some further reduction in the number of farms, number of farms with automobiles increased until in 1945 the number was about the same as in 1930. From 1945 to 1950, the decline in number of farms with automobiles was noteworthy. Contributing to this decline was a further marked reduction in the number of farms. The number of farms with automobiles reported in 1954 is substantially the same as the number reported in 1950.

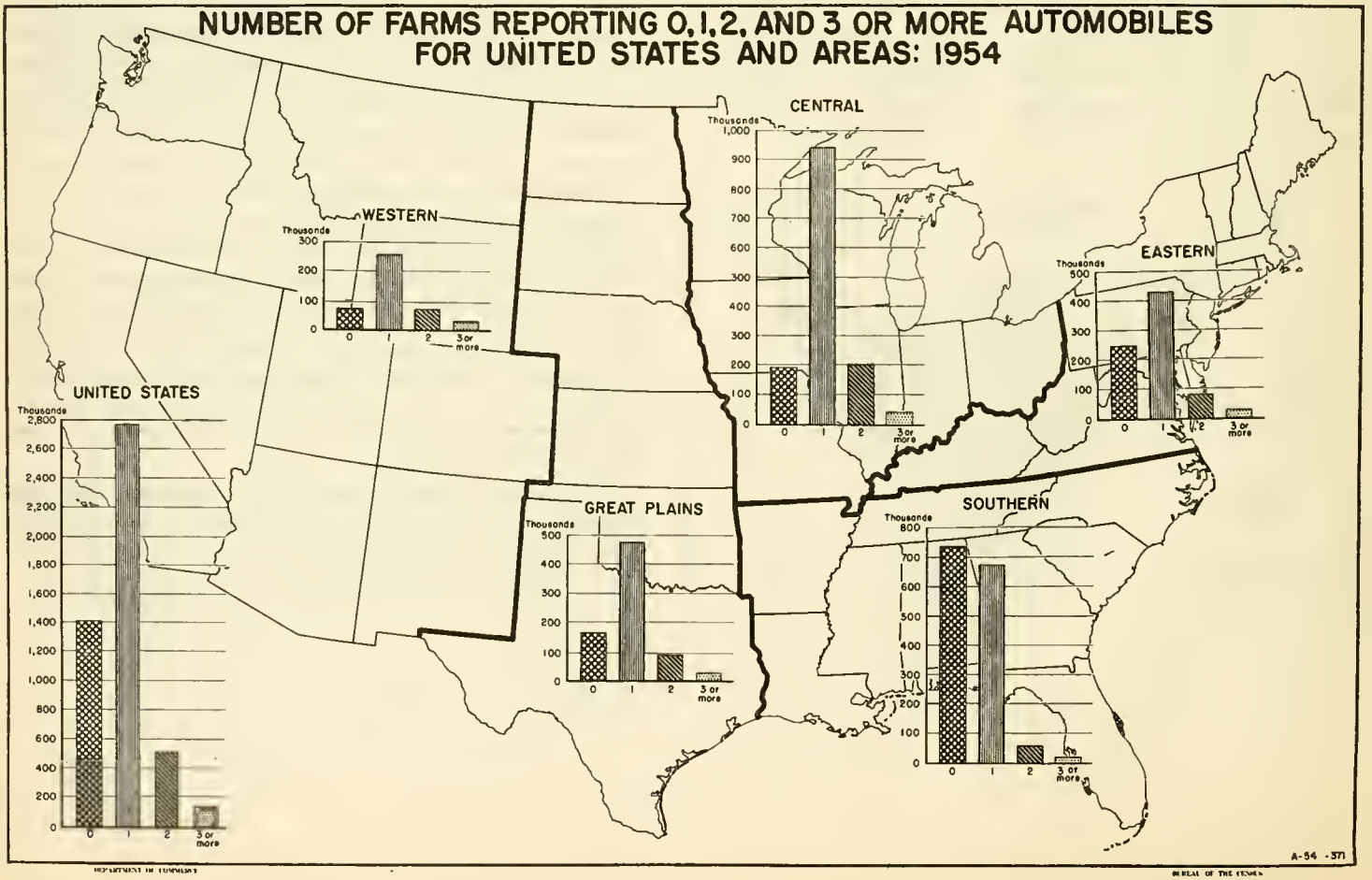
Regional changes during the different periods followed the pattern of change for the United States, with the exception of the Corn Belt, where the number of farms reporting automobiles increased between 1930 and 1940. More than a fifth of all the farms reporting automobiles in the United States in 1954 were in this area.

The greatest reduction between 1945 and 1954 in the number of farms reporting automobiles occurred in the Northeast States where the decrease in the number of all farms was greater than in the remaining States. Farmers in the Appalachian, Southeast, and Delta States did not acquire automobiles as rapidly as those in other areas, but the trend in numbers has been upward since 1940. In the Northern and Southern Plains States, where consolidation of farms into larger units has been most pronounced, the trend by 10-year intervals in number of farms reporting automobiles has been downward since 1940.

Almost a third of the farms in the United States reported no automobiles in 1954. Farms with no automobiles are usually small, low-income places, and sometimes are located in rough places not readily accessible to improved roads. Some of them are operated by elderly folks who no longer drive an automobile. Some are farmers who use a pick-up truck for farm and family transportation. Such farms without automobiles were reported in all five areas shown on the map for 1954. They were especially numerous in the southern area, and considerable numbers were in the eastern area.

Of the farms reporting automobiles, more than 80 percent had 1, and the other farms had 2 or more. Farms reporting two or more automobiles are most numerous in the central area, and least numerous in the southern area.


NUMBER OF FARMS REPORTING AUTOMOBILES FOR THE UNITED STATES AND AREAS, 1920–1954
PACIFIC
NORTHERN PLAINS
LAKE STATES
NORTHEAST
CORN BELT
MOUNTAIN
UNITED STATES
APPALACHIAN
SOUTHERN PLAINS
SOUTHEAST
MISS. DELTA
Thousands
1920 1930 1940 1945 1950 1954
A-54 -369


NUMBER OF FARMS REPORTING 0, 1, 2, AND 3 OR MORE AUTOMOBILES FOR UNITED STATES AND AREAS: 1954
CENTRAL
WESTERN
EASTERN
UNITED STATES
GREAT PLAINS
SOUTHERN
Thousands
0 1 2 3 or more
A-54 -371

NUMBER OF AUTOMOBILES, BY SIZE OF FARM

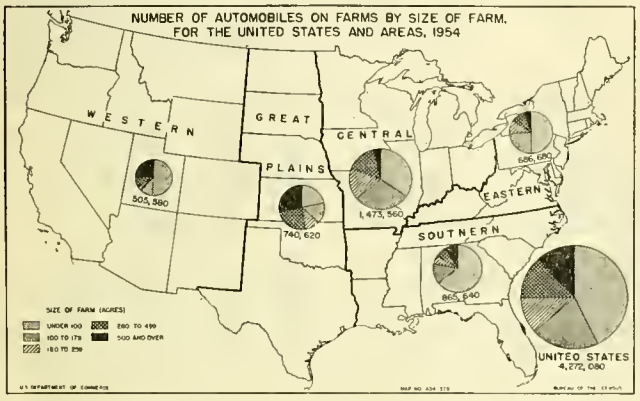
About 70 percent of all farms in the United States reported one or more automobiles in 1954. Although the larger farms had more automobiles per farm than did the small farms, the distribution of automobiles by size of farm is governed to some extent by the number of farms in each size group. For example, because of the preponderance of the smaller farms, or those of less than 100 acres, this group had a larger proportion of all automobiles in 1954 than any other size group. Although many small farms of less than 50 acres do not have an automobile, there are so many of them that, as a group, they reported 27 percent of all automobiles on farms in 1954.

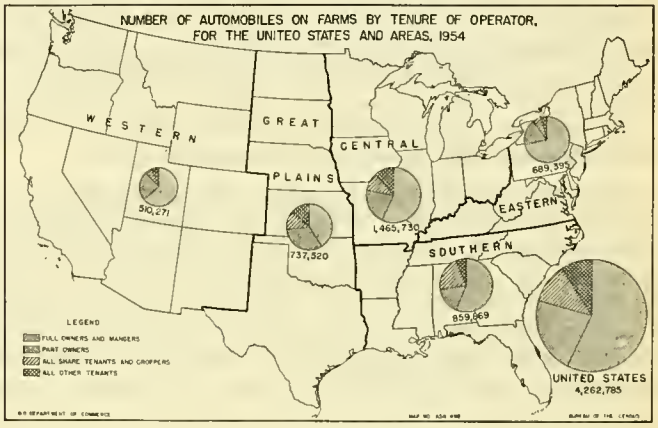
The eastern and southern areas of the country with many small farms reported more than a third of all of the automobiles on farms, and the rich agricultural Central States reported another third.

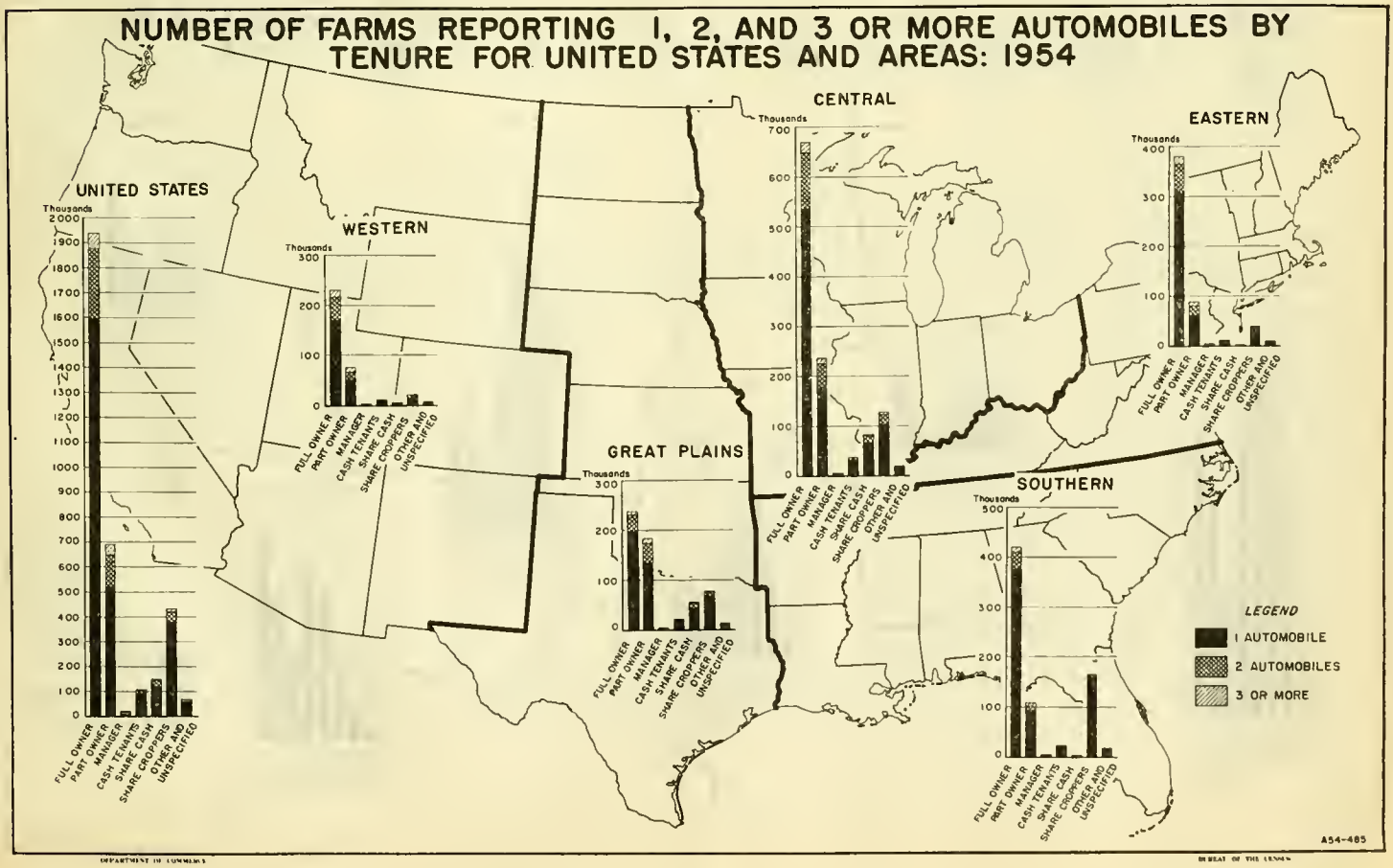
In the western area, farms of less than 30 acres, and those of more than 1,000 acres reported half of all automobiles on farms in that area. This region contains large numbers of fruit and truck farms, many of which are small in acreage, but are intensively operated and consistently are well equipped with automobiles and some types of farm machinery.

NUMBER OF AUTOMOBILES, BY TENURE OF FARM OPERATOR

Well over half of the automobiles on farms in the United States in 1954 were on farms operated by full owners, and 80 percent were reported by full owners, part owners, and managers. Tenants of all classes reported 20 percent of the total number. Share tenants and croppers accounted for about half of the automobiles on tenant-operated farms.







Full-owner and part-owner operated farms are the dominant tenure types in all five regions. Share-tenant and cropper operated farms reporting automobiles are especially numerous in the Southern and Great Plains regions.

Only about one-ninth of the automobiles on farms in the western area were on farms operated by tenants.

A large share of the farms reporting 1, 2, and 3 or more automobiles were operated by full owners and part owners, the two most important tenure classes in the United States, in 4 of the 5 regions. In the Southern area share-tenant and cropper farms having one automobile each exceed the number of part-owner farms having automobiles.

NUMBER OF AUTOMOBILES, BY ECONOMIC CLASS OF FARM

Of the 4.3 million automobiles on farms in 1954, three-quarters of them were on commercial farms and one-quarter was on noncommercial farms. Economic Classes I to IV contain farms reporting sales of products of $2,500 or more per farm in 1954. This group contains 44 percent of all farms and reported 57 percent of all automobiles on farms. Many of the farms in the lower economic classes reported no automobiles, and relatively few of those reporting automobiles had more than one.

Farms in Economic Class I, or those with $25,000 or more in value of products sold in 1954, had the largest proportion of farms reporting 2 and 3 or more automobiles per farm in the United States. As the value of farm products sold declined the proportion of farms having more than one automobile declined. Generally, the farms in the higher economic classes were larger, employed more labor, and had greater need for more than one automobile than did the farms in the lower economic classes. Relatively few of the part-time and residential farms reported more than one automobile.

The number of farms with automobiles and the number with 2 and 3 or more per farm are heavily concentrated in the Central States. In all regions a considerable proportion of the farms in the higher economic classes and in the part-time class reported more than one automobile. In all areas very few farms in Economic Class VI, the lowest commercial farm class, reported more than one automobile.

Table 8.—Number of Farms, and Farms Reporting and Number of Automobiles, by Size of Farm, for the United States: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Size of farm	All farms		Automobiles				
			Farms reporting		Number of automobiles		
	Number (000)	Percent distribution	Number (000)	Percent of all farms	Total (000)	Average number per farm (all farms)	Average number per farm reporting
Total	4,806	100.0	3,396	70.7	4,272	0.9	1.3
Under 10 acres	489	10.2	300	61.3	343	.7	1.1
10 to 29 acres	719	15.0	404	56.1	463	.6	1.1
30 to 49 acres	497	10.4	300	60.3	344	.7	1.1
50 to 69 acres	348	7.2	219	63.0	254	.7	1.2
70 to 99 acres	519	10.8	359	69.2	418	.8	1.2
100 to 139 acres	492	10.2	359	72.9	430	.9	1.2
140 to 179 acres	463	9.6	372	80.3	454	1.0	1.2
180 to 219 acres	259	5.4	208	80.4	259	1.0	1.2
220 to 259 acres	210	4.4	174	83.2	222	1.1	1.3
260 to 499 acres	488	10.2	417	85.5	577	1.2	1.4
500 to 999 acres	191	4.0	168	87.8	265	1.4	1.6
1,000 acres and over	131	2.7	116	88.6	243	1.9	2.1

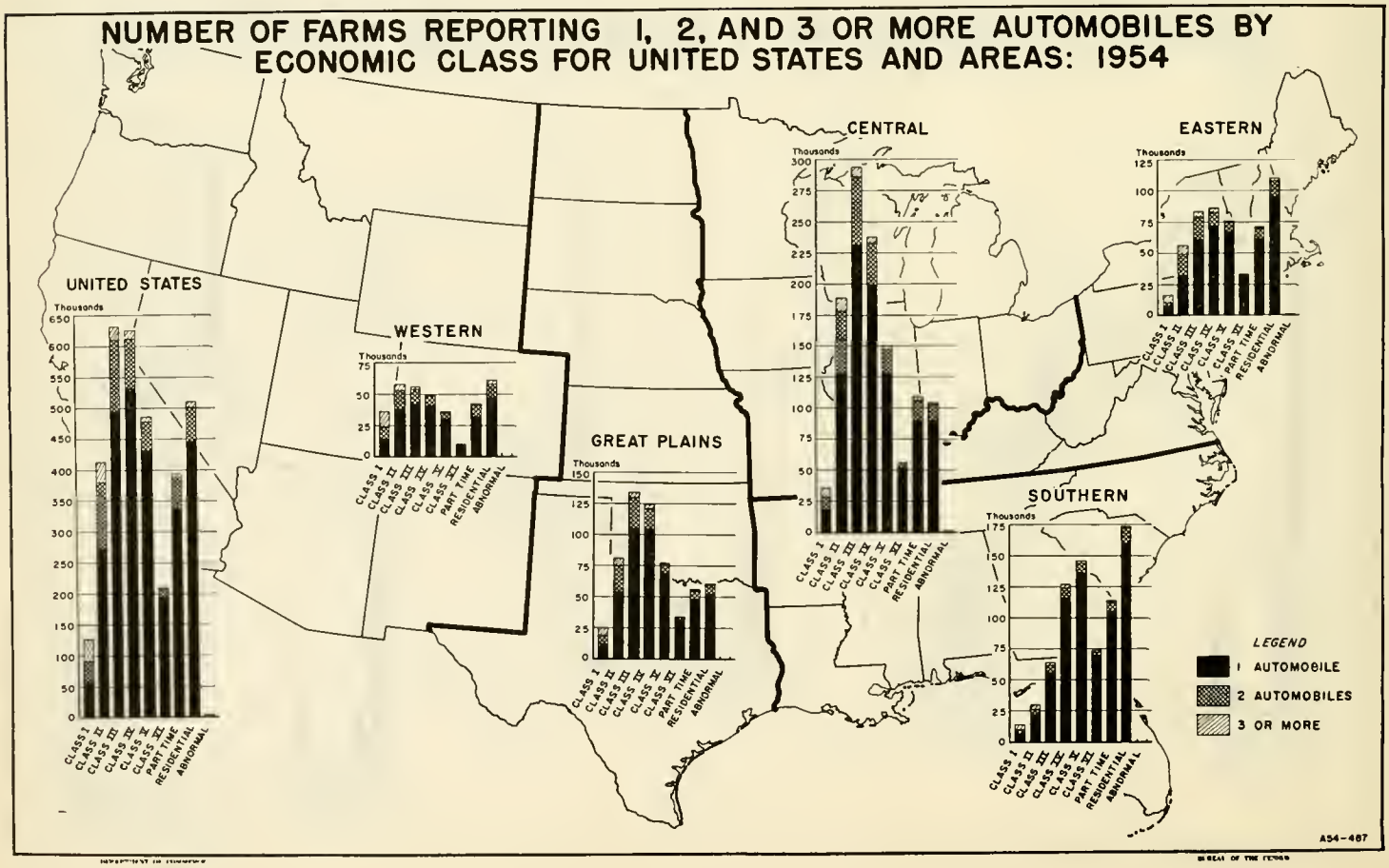


Table 9.—Number of Farms, and Farms Reporting and Number of Automobiles, by Tenure of Operator, for the United States: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Tenure of operator	All farms		Automobiles				
			Farms reporting		Number of automobiles [1]		
	Number (000)	Percent distribution	Number (000)	Percent of all farms	Total (000)	Average number per farm (all farms)	Average number per farm reporting
Total	4,806	100.0	3,396	70.7	4,263	0.9	1.3
Full owners	2,761	57.4	1,937	70.2	2,386	.9	1.2
Part owners	872	18.1	690	79.2	938	1.1	1.4
Managers	22	.5	17	78.3	52	2.4	3.0
All tenants	1,151	23.9	751	65.2	886	.8	1.2
Cash tenants	160	3.3	105	65.9	125	.8	1.2
Share-cash tenants	165	3.4	148	89.6	180	1.1	1.2
Share tenants and croppers	717	14.9	431	60.1	499	.7	1.2
Other and unspecified tenants	110	2.3	67	61.4	83	.8	1.2

[1] Estimates are based on a sample of approximately 20 percent of the farms.

Table 10.—Number of Farms, and Farms Reporting and Number of Automobiles, by Economic Class of Farm, for the United States and Areas: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Economic class of farm	All farms		Automobiles				
			Farms reporting		Number of automobiles [1]		
	Number (000)	Percent distribution	Number (000)	Percent of all farms	Total (000)	Average number per farm (all farms)	Average number per farm reporting
Total	4,806	100.0	3,396	70.7	4,263	0.9	1.3
Commercial farms	3,353	69.8	2,491	74.3	3,200	1.0	1.3
Class I	136	2.8	127	93.9	305	2.3	2.4
Class II	443	9.2	413	93.2	603	1.4	1.5
Class III	726	15.1	631	86.9	774	1.1	1.2
Class IV	821	17.1	626	76.2	730	.9	1.2
Class V	769	16.0	486	63.2	558	.7	1.1
Class VI	458	9.5	209	45.6	230	.5	1.1
Other farms	1,453	30.2	905	62.3	1,062	.7	1.2

[1] Estimates are based on a sample of approximately 20 percent of the farms.

Table 11.—PERCENT DISTRIBUTION OF ALL FARMS AND NUMBER OF AUTOMOBILES, BY ECONOMIC CLASS OF FARM, FOR THE UNITED STATES AND AREAS: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Economic class of farm	United States		Area									
	All farms	Automobiles	Eastern		Southern		Central		Great Plains		Western	
			All farms	Automobiles	All farms	Automobiles	All farms	Automobiles	All farms	Automobiles	All farms	Automobiles
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Commercial farms	69.8	75.1	61.2	67.8	62.2	62.0	79.8	82.8	75.4	82.1	69.2	74.6
Class I	2.8	7.2	2.2	6.4	1.1	4.6	2.7	4.8	3.5	6.7	9.1	19.9
Class II	9.2	14.2	8.0	13.1	2.7	5.1	14.1	18.3	11.3	15.8	14.7	16.5
Class III	15.1	18.2	12.2	15.2	6.7	8.9	23.1	24.0	19.6	22.5	15.7	14.9
Class IV	17.1	17.1	14.1	15.1	15.4	16.1	20.0	19.2	19.4	19.9	14.8	11.6
Class V	16.0	13.1	15.0	12.7	21.2	18.0	13.7	12.2	13.8	12.3	10.9	9.0
Class VI	9.5	5.4	9.7	5.3	15.0	9.4	6.1	4.3	7.9	5.0	4.0	2.7
Other farms	30.2	24.9	38.8	32.2	37.8	38.0	20.2	17.2	24.6	17.9	30.8	25.4

Table 12.—PERCENT DISTRIBUTION OF ALL FARMS AND NUMBER OF AUTOMOBILES, BY TENURE OF OPERATOR, FOR THE UNITED STATES AND AREAS: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Tenure of operator	United States		Area									
	All farms	Automobiles	Eastern		Southern		Central		Great Plains		Western	
			All farms	Automobiles	All farms	Automobiles	All farms	Automobiles	All farms	Automobiles	All farms	Automobiles
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Full owners	57.4	56.0	72.6	69.7	52.7	55.0	58.8	56.3	43.4	40.0	67.1	61.0
Part owners	18.1	22.0	14.7	18.2	13.2	16.3	19.0	21.0	28.5	32.5	20.2	24.5
Managers	.5	1.2	.5	1.5	.4	1.5	.3	.6	.5	.7	1.0	2.9
All tenants	23.9	20.8	12.3	10.6	33.7	27.2	21.9	22.0	27.6	26.7	11.7	11.6
Cash tenants	3.3	2.9	2.3	2.0	3.7	3.2	3.1	2.9	4.1	3.3	3.2	3.3
Share-cash tenants	3.4	4.2	.4	.4	.5	.6	6.5	6.8	8.0	8.9	1.1	1.2
Share tenants and croppers	14.9	11.7	7.6	6.3	26.6	20.7	10.3	10.7	12.9	12.5	5.8	5.7
Other and unspecified tenants	2.3	1.9	2.0	1.9	2.9	2.7	1.9	1.6	2.5	2.1	1.6	1.5

MOTORTRUCKS ON FARMS

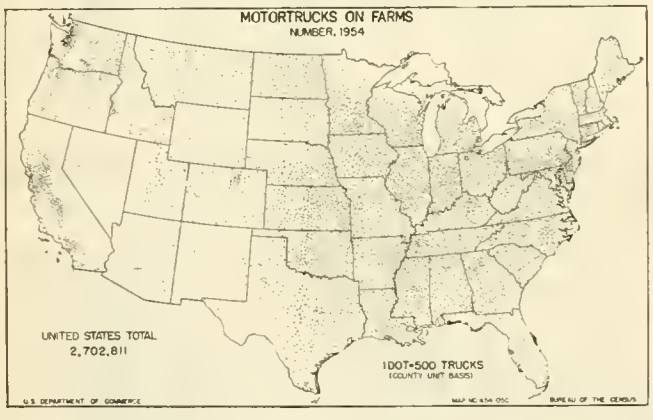
Delivery of crops and livestock to market and of supplies to the farm always has been a sizable job. Before the motortruck became available, fat cattle, sheep, and even hogs were often driven on foot to local points of delivery. Horsedrawn wagons and sleds were used to haul crops to market and supplies back home. In the sparsely settled Plains region, it sometimes required more than 1 day to deliver a load of produce. In that region and in other northern agricultural areas, bobsleds were used extensively to haul grain and other produce to market when snow covered the ground. In areas where rainfall was heavy, early dirt roads often became impassable for a team with a load of any size in spring and winter.

The motortruck appealed to farmers. Although the mileage of improved roads in 1920 was small, and motortrucks were far from foolproof, there were 139,000 motortrucks on farms. The number continued to increase rapidly, even through the post World War I years of adjustment. Only during the severe depression years of the 1930's did number of motortrucks on farms decrease.

In November 1954, farmers reported about 2.7 million trucks on their farms. These were widely distributed throughout the country. They were most numerous in areas where farms are numerous and in areas where a relatively large percentage of the total land area is in harvested crops. In most sections of the Corn Belt and in the southern portion of the Lake States, cropland accounts for more than half of the total land.

In these areas motortrucks are relatively numerous in relation to total land area. This is true also in some areas of the Appalachian and Northeast States, and in some of the irrigated and humid areas of the Pacific Coast States where farms tend to be small and where intensive crops are widely grown.

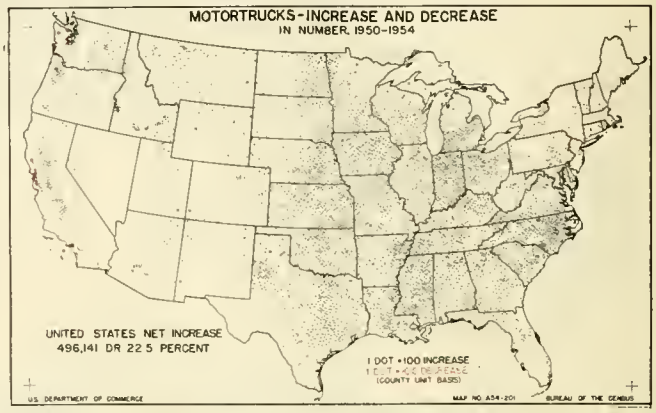
In the more arid areas, where farms are of large size and only a small percentage of the total land is in farms, there are relatively few motortrucks. Nevada, Wyoming, Utah, Arizona, and New Mexico, together had less than 3 percent of farm motortrucks reported in November 1954.



From April 1950 to November 1954 total motortrucks on farms increased from 2.2 million to 2.7 million, or by 23 percent. Increases were reported in all States except New York, Massachusetts, Maine, New Hampshire, and Rhode Island, where moderate decreases were reported.

Counties reporting increases in numbers of motortrucks since the 1950 Census were numerous and widely distributed throughout the country. The pattern of increase by counties followed rather closely the pattern of total distribution of motortrucks. In the Northeast States, total numbers of motortrucks on farms changed but little from April 1950 to November 1954 and relatively few counties in this area reported increases in numbers of motortrucks. In the more arid areas of the country, and in the northern portions of the Lake States truck numbers increased in many counties.

Counties reporting declines in the number of motortrucks tend to be concentrated in the Northeast States. Scattering counties in other areas also reported declines in the number of motortrucks. In general the counties in which motortruck numbers declined from April 1950 to November 1954, had relatively large expansion in nonfarm population and farm consolidation.



FARMS REPORTING MOTORTRUCKS

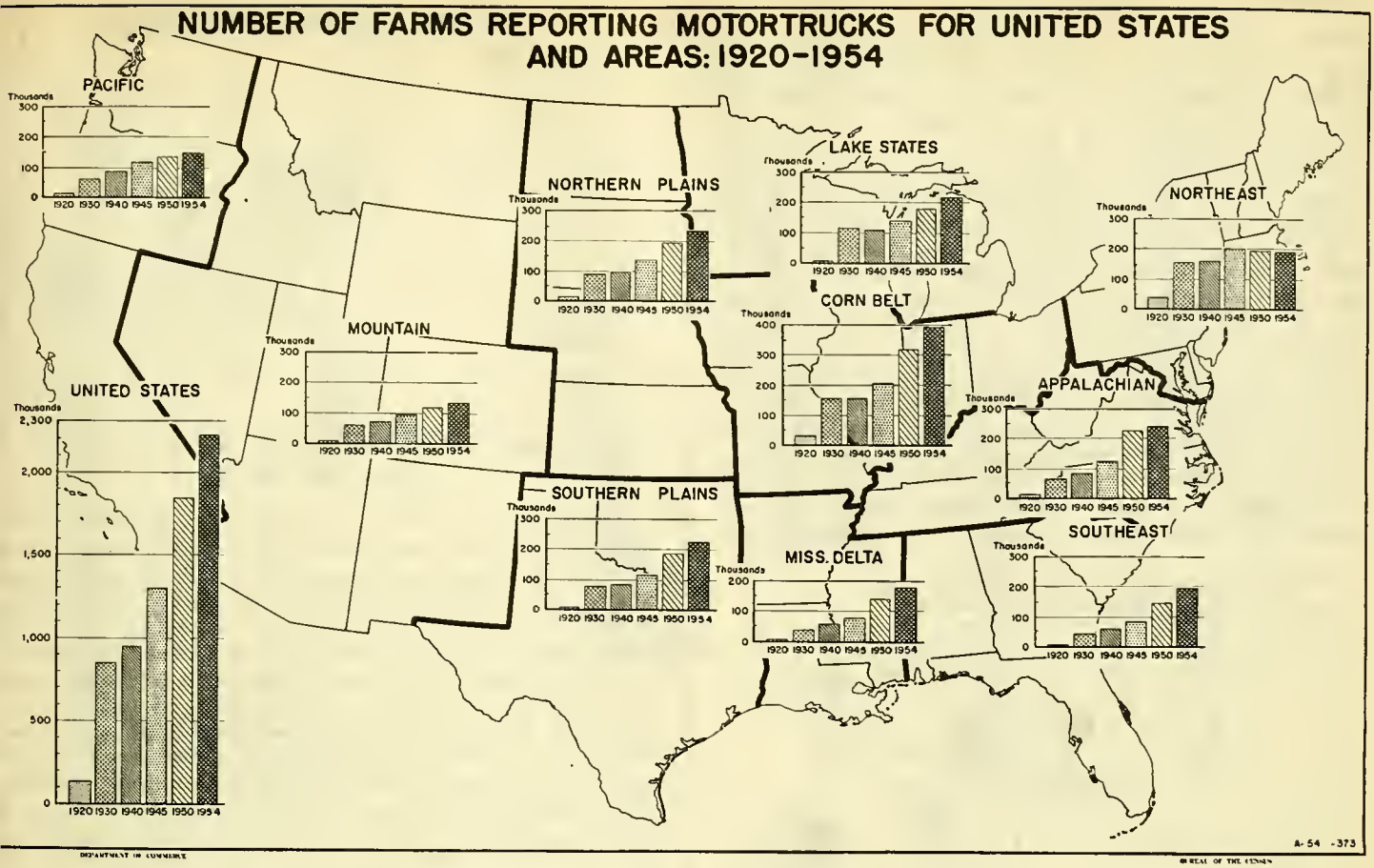
In 1920, only 132,000 of the 6,448,000 farms in the United States reported motortrucks. Since 1920, each Census has shown increases in the number of farms reporting motortrucks. From 1920 to 1930 the increase in number of farms reporting motortrucks occurred in all areas, and ranged from a low of about 400 percent in the Northeast and Corn Belt States to more than 900 percent in the Mississippi Delta, Southern Plains, and Lake States.

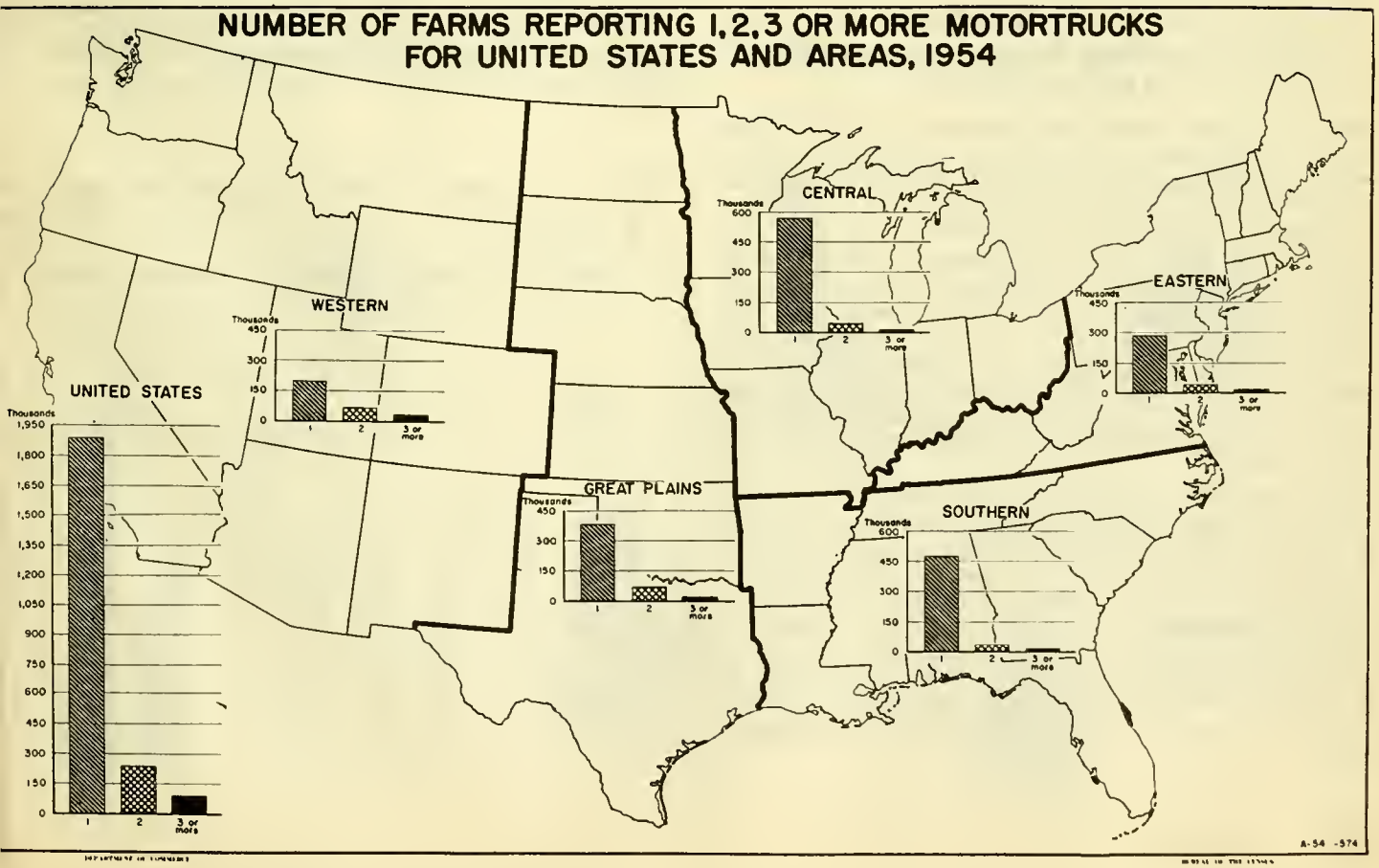
During the years of relatively low prices and adjustment from 1930 to 1940, numbers of farms with motortrucks increased moderately in all areas, except in the Lake States, Corn Belt, and Northeast. From 1940 to November 1954, farms reporting motortrucks increased by 1,269,000, or by 134 percent. Of this increase, 43 percent occurred between 1945 and 1950.

The pattern of increase in farms reporting motortrucks since 1940 has varied widely in the different areas. Percentage increases in the Southeastern, Appalachian, and Mississippi Delta States, areas in which mechanization lagged for some time, have consistently been substantially above the average since 1940. In the Southern and Corn Belt areas, relative increases in numbers have been above average, and in the Pacific, Mountain, and Lake States increases since 1940 have been less than the average for all areas. In the Northeast States the number of farms reporting motortrucks has declined slightly since 1945, primarily because of large reductions in numbers of farms.

MOTORTRUCKS PER FARM

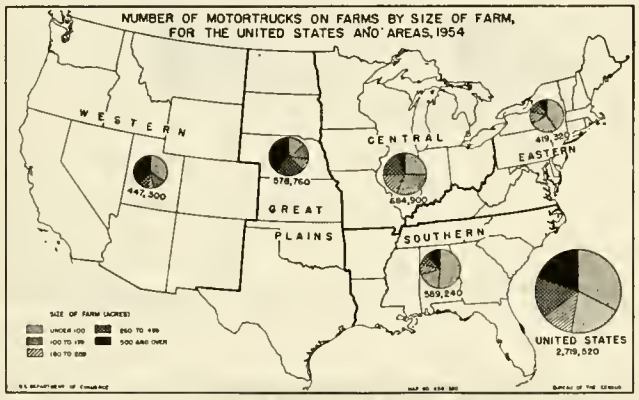
In November 1954, about 85 percent of the farms reporting motortrucks had only 1, and about 4 percent reported 3 or more. Number of motortrucks per farm is closely associated with size and type of farm business and distance to markets. In the areas east of the Mississippi River, few farms reported more than one motortruck. But in the Great Plains and Western areas where hauling distances are greater and where considerable quantities of grain, sugar beets, fruits, vegetables, and other cash crops are grown for sale, farms reporting two or more trucks were most numerous. In the western area, a fifth of the farms reporting motortrucks had 2 trucks, and 10 percent had 3 or more.


NUMBER OF FARMS REPORTING MOTORTRUCKS FOR UNITED STATES AND AREAS: 1920–1954
PACIFIC
NORTHERN PLAINS
LAKE STATES
NORTHEAST
MOUNTAIN
CORN BELT
UNITED STATES
APPALACHIAN
SOUTHERN PLAINS
SOUTHEAST
MISS. DELTA
Thousands
1920 1930 1940 1945 1950 1954
A-54 -373


NUMBER OF FARMS REPORTING 1, 2, 3 OR MORE MOTORTRUCKS FOR UNITED STATES AND AREAS, 1954
CENTRAL
WESTERN
EASTERN
UNITED STATES
GREAT PLAINS
SOUTHERN
Thousands
1
2
3 or more
A-54 -374

NUMBER OF MOTORTRUCKS, BY SIZE OF FARM

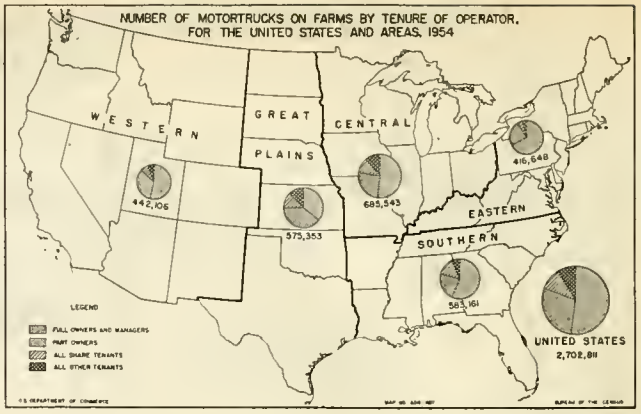
About 46 percent of all farms reported one or more motortrucks in 1954. Roughly, a third of the motortrucks reported were on farms of less than 100 acres in size, another third were on farms of 100 to 259 acres, and the remaining third were on farms of 260 acres or more in size. Almost a fifth of all motortrucks were reported by farmers who were operating less than 50 acres of land. The large number of farms of the smaller sizes is responsible for this group having such a high proportion of all motortrucks.. Frequency of motortrucks is directly related to the size of farm. For example, in 1954, there were about 35 motortrucks on each 100 farms of less than 100 acres, 60 motortrucks per hundred farms of 100 to 259 acres, and 120 per 100 farms of 260 or more acres. On a regional basis, motortrucks per 100 farms ranged from 40 in the southern area to 106 in the western area. The numbers reported include trucks of all ages and sizes that are on farms. Probably few of them have a rated capacity of more than 3 tons. Many of them are of 1½-ton rated capacity and some of them, especially those of the pickup type, have a rated capacity of one-half ton. Generally, the trucks of higher capacity are on the larger farms.



NUMBER OF MOTORTRUCKS, BY TENURE OF FARM OPERATOR

In November 1954, farmers who own all the land they operate had half of the farm motortrucks, and full owners and part owners combined had about 80 percent of all motortrucks on farms. Tenants of all classes had 20 percent of the total number of motortrucks on farms. Share tenants and croppers had more than half of all motortrucks reported by tenants of all classes. Full owners and part owners are the dominant tenure classes in each of the five major areas, and, consequently, own a large proportion of farm motortrucks in each area. Motortrucks owned by share tenants and croppers are especially numerous in the Southern area, although share tenants and croppers represent a significant part of motortruck owners in the other four areas, especially in the Central, Great Plains, and Western areas.

Each of the tenure classes shown in the maps contained many small farms, many of which reported no motortrucks in 1954. Of the farms that reported motortrucks the number having only 1 truck ranged from 78 percent for part owners to 89 percent for full owners. About 16 percent of the part owners had 2 trucks each and 6 percent had 3 or more trucks per farm. In the other 3 tenure groups combined, approximately 10 percent reported 2 trucks and 3 percent reported 3 or more. In each of the 5 regions, most of the farms having more than 1 truck were in the owner, part-owner, and share-tenant and cropper tenure groups.



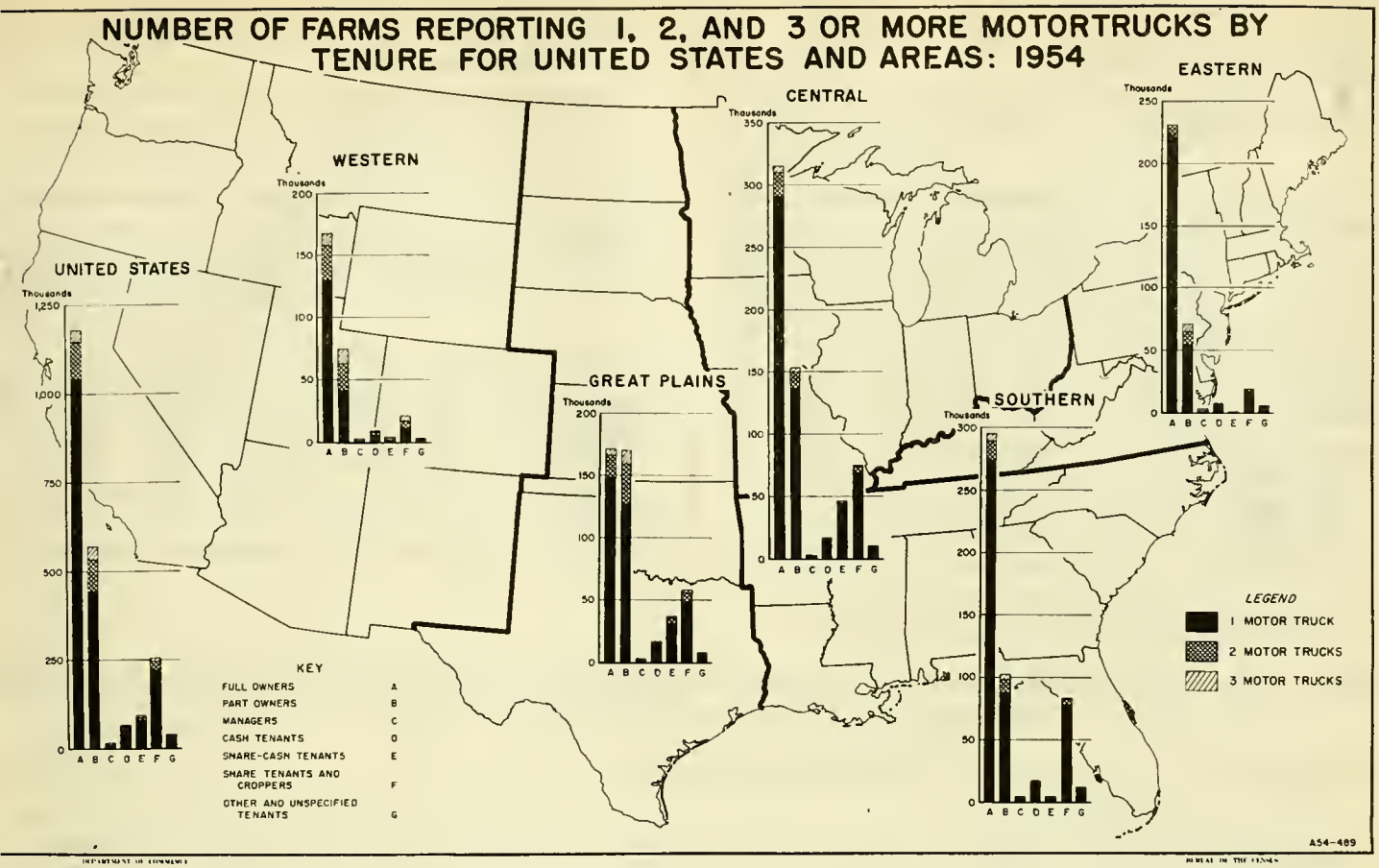
NUMBER OF MOTORTRUCKS, BY ECONOMIC CLASS OF FARM

Farms with a large volume of sales have substantially more motortrucks per 100 farms than do farms with a lesser volume of sales. For example, 90 percent of the farms in Economic Class I, those with farm sales of $25,000 or more, reported 1 or more motortrucks in 1954, whereas only 30 percent of the commercial farms in the lowest economic class reported motortrucks. In between these two extremes, the percentage of farms reporting motortrucks by economic class declined as volume of sales decreased. This general pattern of relationship between volume of sale and number of farms reporting motortrucks exists for each of the five areas as well as for the United States. Because of the large numbers of small farms in the Southern and Eastern areas, relatively large numbers of commercial farms having sales of less than $1,200, part-time, and residential farms reported motortrucks. Many of the farms having motortrucks in these 3 economic classes reported only 1 truck. Most farms that reported 2 or 3 motortrucks were in the higher income economic class groups. Farms having more than one truck were relatively numerous in the Great Plains and Western regions, where large quantities of crops per farm and hauled to market.

Table 13.—Number of Farms, and Farms Reporting and Number of Motortrucks by Size of Farm, for the United States: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Size of farm	All farms		Motortrucks				
			Farms reporting		Number of motortrucks		
	Number (000)	Percent distribution	Number (000)	Percent of all farms	Total (000)	Average number per farm (all farms)	Average number per farm reporting
Total	4,806	100.0	2,217	46.1	2,720	0.6	1.2
Under 10 acres	489	10.2	119	24.2	130	.3	1.1
10 to 29 acres	719	15.0	184	25.7	202	.3	1.1
30 to 49 acres	497	10.4	161	32.4	177	.4	1.1
50 to 69 acres	348	7.2	126	36.3	139	.4	1.1
70 to 99 acres	519	10.8	219	42.2	240	.5	1.1
100 to 139 acres	492	10.2	238	48.3	266	.5	1.1
140 to 179 acres	463	9.6	247	53.4	278	.6	1.1
180 to 219 acres	259	5.4	151	58.3	169	.6	1.1
220 to 259 acres	210	4.4	132	63.1	155	.7	1.2
260 to 499 acres	488	10.2	353	72.3	439	.9	1.2
500 to 999 acres	191	4.0	166	86.6	247	1.3	1.5
1,000 acres and over	131	2.7	120	91.8	278	2.1	2.3


NUMBER OF FARMS REPORTING 1, 2, AND 3 OR MORE MOTORTRUCKS BY TENURE FOR UNITED STATES AND AREAS: 1954
UNITED STATES
WESTERN
CENTRAL
EASTERN
GREAT PLAINS
SOUTHERN
Thousands
A B C D E F G
KEY
FULL OWNERS A
PART OWNERS B
MANAGERS C
CASH TENANTS D
SHARE-CASH TENANTS E
SHARE TENANTS AND CROPPERS F
OTHER AND UNSPECIFIED TENANTS G
LEGEND
1 MOTOR TRUCK
2 MOTOR TRUCKS
3 MOTOR TRUCKS
A54-489

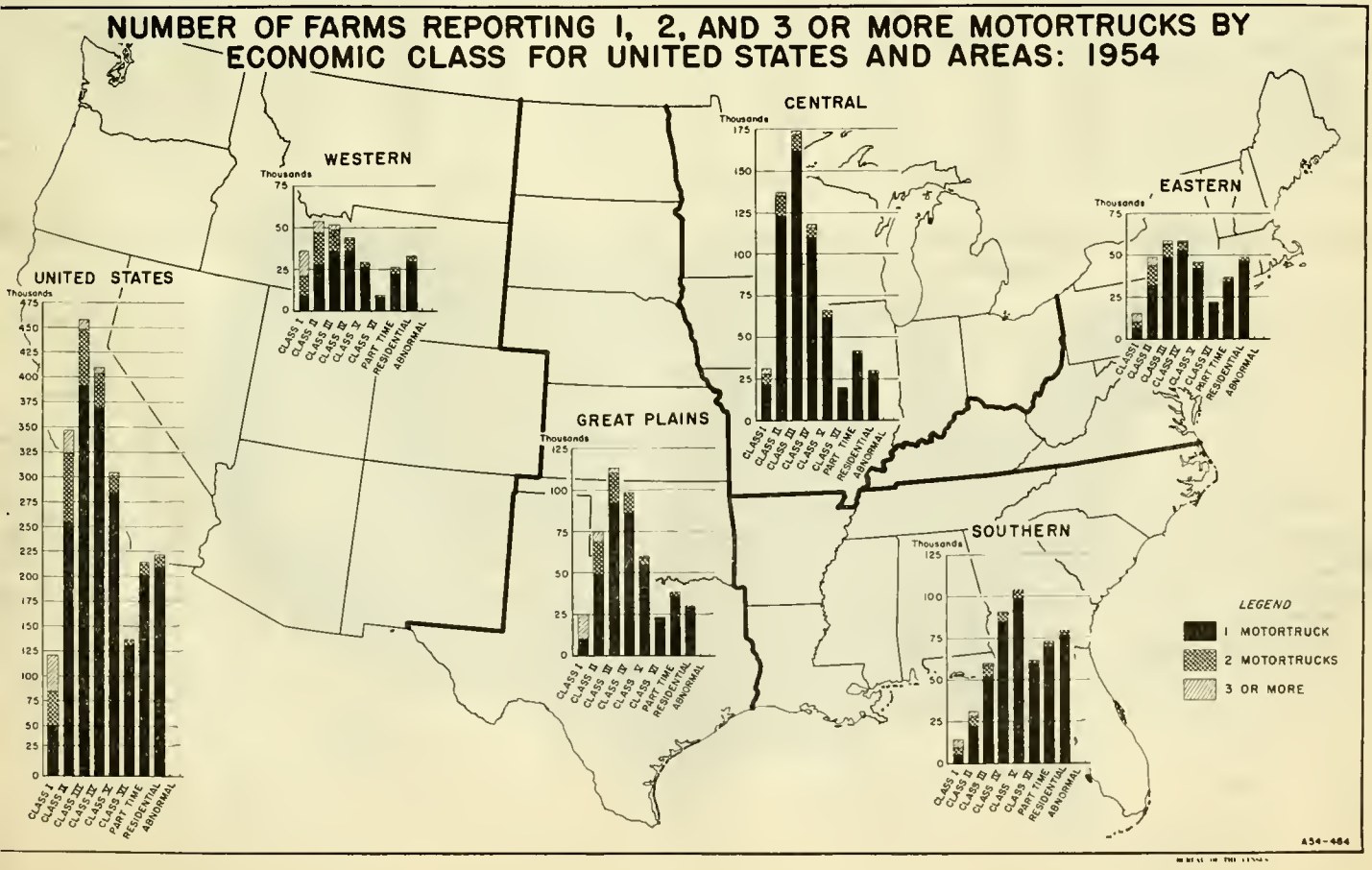

NUMBER OF FARMS REPORTING 1, 2, AND 3 OR MORE MOTORTRUCKS BY ECONOMIC CLASS FOR UNITED STATES AND AREAS: 1954
UNITED STATES
WESTERN
CENTRAL
EASTERN
GREAT PLAINS
SOUTHERN
Thousands
CLASS I
CLASS II
CLASS III
CLASS IV
CLASS V
CLASS VI
PART TIME
RESIDENTIAL
ABNORMAL
LEGEND
1 MOTORTRUCK
2 MOTORTRUCKS
3 OR MORE
A54-484

Table 14.—Number of Farms, and Farms Reporting and Number of Motortrucks, by Tenure of Operator, for the United States: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Tenure of operator	All farms		Motortrucks				
			Farms reporting		Number of motortrucks [1]		
	Number (000)	Percent distribution	Number (000)	Percent of all farms	Total (000)	Average number per farm (all farms)	Average number per farm reporting
Total	4,806	100.0	2,217	46.1	2,703	0.6	1.2
Full owners	2,761	57.4	1,178	42.7	1,364	.5	1.2
Part owners	872	18.1	571	65.5	772	.9	1.4
Managers	22	.5	16	71.0	47	2.1	3.0
All tenants	1,151	23.9	452	39.3	519	.5	1.1
Cash tenants	160	3.3	67	41.9	81	.5	1.2
Share-cash tenants	165	3.4	92	55.7	107	.6	1.2
Share tenants and croppers	717	14.9	255	35.6	286	.4	1.1
Other and unspecified tenants	110	2.3	38	34.5	46	.4	1.2

[1] Estimates are based on a sample of approximately 20 percent of the farms.

Table 15.—Number of Farms, and Farms Reporting and Number of Motortrucks, by Economic Class of Farm, for the United States: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Economic class of farm	All farms		Motortrucks				
			Farms reporting		Number of motortrucks [1]		
	Number (000)	Percent distribution	Number (000)	Percent of all farms	Total (000)	Average number per farm (all farms)	Average number per farm reporting
Total	4,806	100.0	2,217	46.1	2,703	0.6	1.2
Commercial farms	3,353	69.8	1,778	53.0	2,223	.7	1.3
Class I	136	2.8	121	89.2	284	2.1	2.3
Class II	443	9.2	347	78.4	477	1.1	1.4
Class III	726	15.1	458	63.1	530	.7	1.2
Class IV	821	17.1	410	50.0	454	.6	1.1
Class V	769	16.0	305	39.6	334	.4	1.1
Class VI	458	9.5	137	29.9	144	.3	1.0
Other farms	1,453	30.2	438	30.2	479	.3	1.1

[1] Estimates are based on a sample of approximately 20 percent of the farms.

Table 16.—PERCENT DISTRIBUTION OF ALL FARMS, AND NUMBER OF MOTORTRUCKS, BY ECONOMIC CLASS OF FARM, FOR THE UNITED STATES AND AREAS: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Economic class of farm	United States		Area									
			Eastern		Southern		Central		Great Plains		Western	
	All farms	Motortrucks	All farms	Motortrucks	All farms	Motortrucks	All farms	Motortrucks	All farms	Motortrucks	All farms	Motortrucks
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Commercial farms	69.8	82.3	61.2	77.2	62.2	71.9	79.8	88.2	75.4	87.8	69.2	84.2
Class I	2.8	10.6	2.2	9.5	1.1	6.1	2.7	6.8	3.5	9.1	9.1	24.9
Class II	9.2	17.7	8.0	17.2	2.7	7.2	14.1	23.0	11.3	19.9	14.7	20.7
Class III	15.1	19.6	12.2	17.6	6.7	11.2	23.1	26.2	19.6	24.2	15.7	16.3
Class IV	17.1	16.8	14.1	15.4	15.4	17.4	20.0	18.4	19.4	19.2	14.8	11.8
Class V	16.0	12.4	15.0	12.3	21.2	19.2	13.7	10.5	13.8	11.0	10.9	7.9
Class VI	9.5	5.3	9.7	5.3	15.0	10.8	6.1	3.3	7.9	4.3	4.0	2.5
Other farms	30.2	17.7	38.8	22.8	37.8	28.1	20.2	11.8	24.6	12.2	30.8	15.8

Table 17.—PERCENT DISTRIBUTION OF ALL FARMS, AND NUMBER OF MOTORTRUCKS, BY TENURE OF OPERATOR, FOR THE UNITED STATES AND AREAS: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Tenure of operator	United States		Area									
			Eastern		Southern		Central		Great Plains		Western	
	All farms	Motortrucks	All farms	Motortrucks	All farms	Motortrucks	All farms	Motortrucks	All farms	Motortrucks	All farms	Motortrucks
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Full owners	67.4	50.5	72.6	65.6	52.7	54.7	58.8	51.2	43.4	35.0	67.1	49.8
Part owners	18.1	28.6	14.7	23.8	13.2	22.4	19.0	25.5	28.5	39.0	20.2	32.3
Managers	.5	1.7	.5	1.8	.4	1.8	.3	.8	.5	1.0	1.0	4.1
All tenants	23.9	19.2	12.3	8.8	33.7	21.1	21.9	22.5	27.6	25.1	11.7	13.8
Cash tenants	3.3	3.0	2.3	2.1	3.7	3.4	3.1	2.8	4.1	3.1	3.2	3.4
Share-cash tenants	3.4	4.0	.4	.4	.5	.8	6.5	7.0	8.0	7.9	1.1	1.6
Share tenants and croppers	14.9	10.6	7.6	4.7	26.6	14.6	10.3	11.3	12.9	12.4	5.8	7.6
Other and unspecified tenants	2.3	1.7	2.0	1.5	2.9	2.4	1.9	1.5	2.5	1.7	1.6	1.3

ELECTRIC POWER ON FARMS

Extension of electric distribution lines to almost every farm in the United States is one of the outstanding achievements incident to rural progress and farm mechanization. According to estimates made by Edison Electric Institute, only about 100,000 farmers had central-station electric service in 1920, and these made little use of the power outside of their homes. During the next 15 years electric service was extended to about 644,000 more farms which meant that about 11 percent of the farms had such service. In 1936, the Rural Electrification Administration was formed and distribution systems were extended in rural areas much more rapidly.

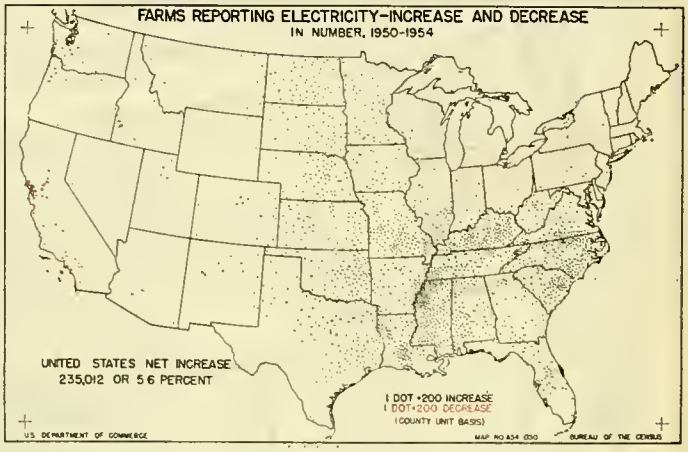
By 1945 almost half of our farms were electrified and during the next 5 years, electric power suppliers were busy constructing additional facilities to serve the people in rural areas. Almost 1.5 million more farms were connected during these 5 years making a total of 77 percent of the farms with electric service.

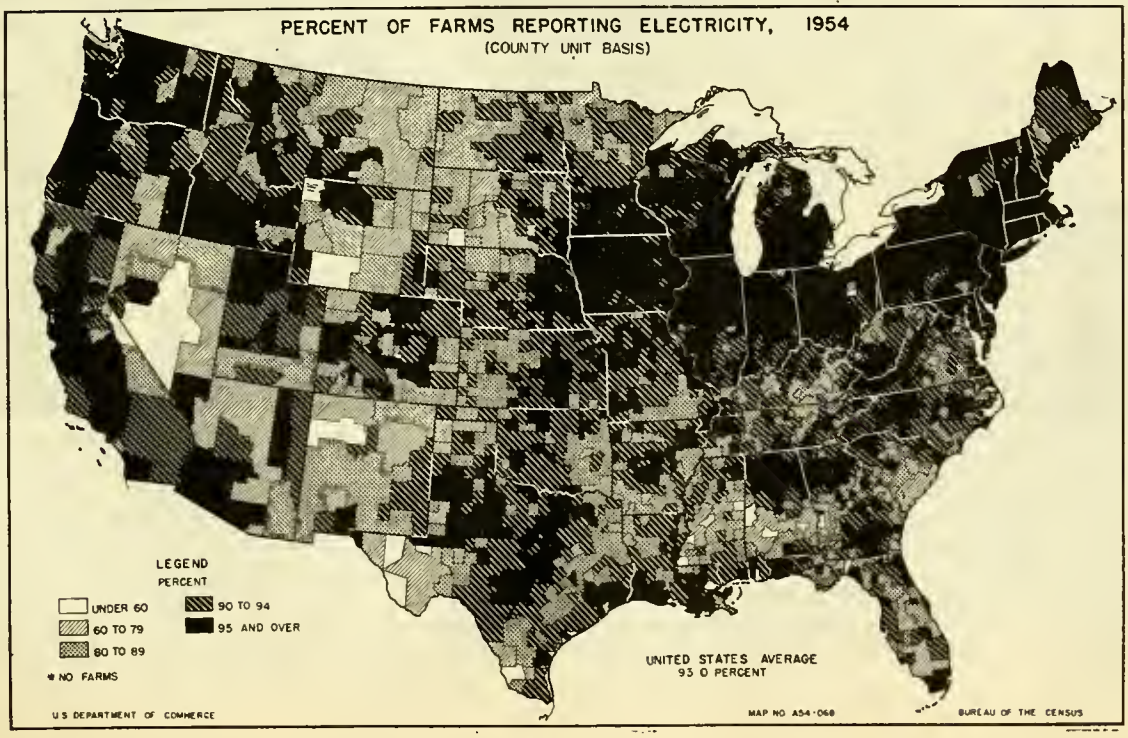
From 1950 to the present time effort to extend electric service to all farms has continued. Distribution systems have been extended across the Great Plains where the density of consumers is low. The service has been expanded in low-income areas so that electric power would be available to all people for electric lights and refrigeration, and other kinds of modern equipment. According to estimates made by Rural Electrification Administration more than 4.5 million farms, or 94.2 percent of the total had central-station electric service on June 30, 1956. In addition to these there were some farms with home generating plants.

Electricity on the farm is used almost exclusively at the farmstead but it is used for three very important purposes, namely, lights, heat, and motive power. It has revolutionized the farm home and made it possible for the farm family to have as modern a home as urban families. For farmwork it is applied to a wide variety of jobs, especially on dairy and poultry farms. Push-button farming still is a long way off, but electric power has done much to reduce costs and increase labor efficiency in farming and in the home.

Electricity is now generally used by farms of all types, sizes, economic classes, and tenures of operator. Almost 90 percent of the share tenants and croppers and about 83 percent of the farms of Economic Class VI reported electric service in 1954. Most of the farms that remain unserved are in parts of the Southern States and in some of the sparsely settled sections of the Mountain area.

By 1950 about 90 percent of all the farms in the Northeast, Lake States, Corn Belt, and Pacific States were receiving electric service. In the Great Plains and Southern States farms receiving electric service continued to increase substantially after 1950. On a county basis, decreases after 1950 in number of farms receiving electric service occurred in widely distributed counties, which were largely concentrated in the Northeast and Central States. These reductions were caused by reductions in the number of farms between the two Census dates, and not by the discontinuance of service by farmers. In some localities the number of rural consumers has actually increased while the number of farm consumers has decreased. This has come about because many urban workers and others have moved to small rural places in the country which, by definition, are not classified as farms.

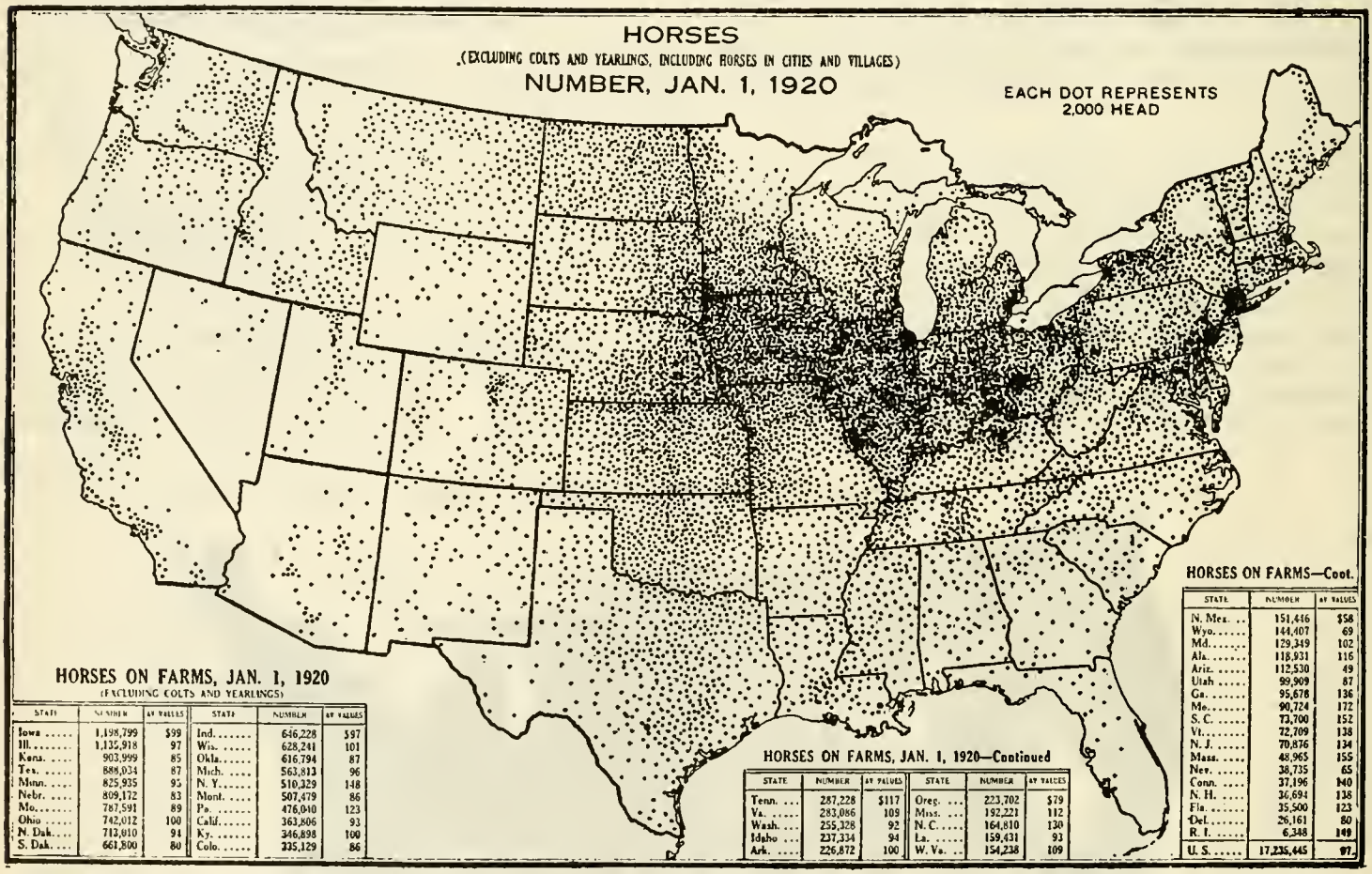




HORSES AND MULES

Horses were first brought to this country by early explorers of the 17th century. Their number in the United States increased rapidly and continuously with the growth of the new Nation until 1918 when the number of horses and mules on farms and in cities, mines, and elsewhere reached a peak of about 30 million head. In a way, the most important result of modern mechanization has been the displacement of about 85 percent of this vast number of horses and mules by mechanical power. The change from animal to mechanical power on farms and elsewhere, involving a decrease of more than 25 million head of horses and mules has diverted about 80 million acres of cropland and much pasture from production of horse and mule feed to the production of food and fiber for human use. Crop acreages thus released between 1918 and 1956 now produce a large share of the food and fiber used to feed and clothe our larger population. Eighty million acres is about a fourth of the total acres of crops harvested in recent years. Annual colt crops, which from 1910 to 1920 usually exceeded 2 million head, have declined to less than 100,000 head. This number is not sufficient to maintain present numbers of horses and mules on farms. However, there are only about 4 million head now on farms, and we can no longer look to disappearance of horses and mules to supply many additional acres for food production.

When farming was done with animal power, horses were used primarily in the northern and western farming areas, and mules were used principally in the Southern States. The horse numbers were most dense in the Central and Lake States where large acreages were in corn and other row crops that required several cultivations during the growing season. The general pattern of horse and mule numbers changed markedly between 1920 and 1954. Density is much thinner throughout the country now than it was in 1920, although numbers of horses and mules still are relatively dense in the Southeastern States. In 1954, about 37 percent of all horses and mules in the United States were in the Appalachian and Southern areas, compared with only 14 percent in 1920. From April 1950 to November 1954, horse and mule numbers decreased throughout the country, although increases were reported in a few counties in Colorado, New Mexico, and Arizona.



HORSES ON FARMS, JAN. 1, 1920
(EXCLUDING COLTS AND YEARLINGS)

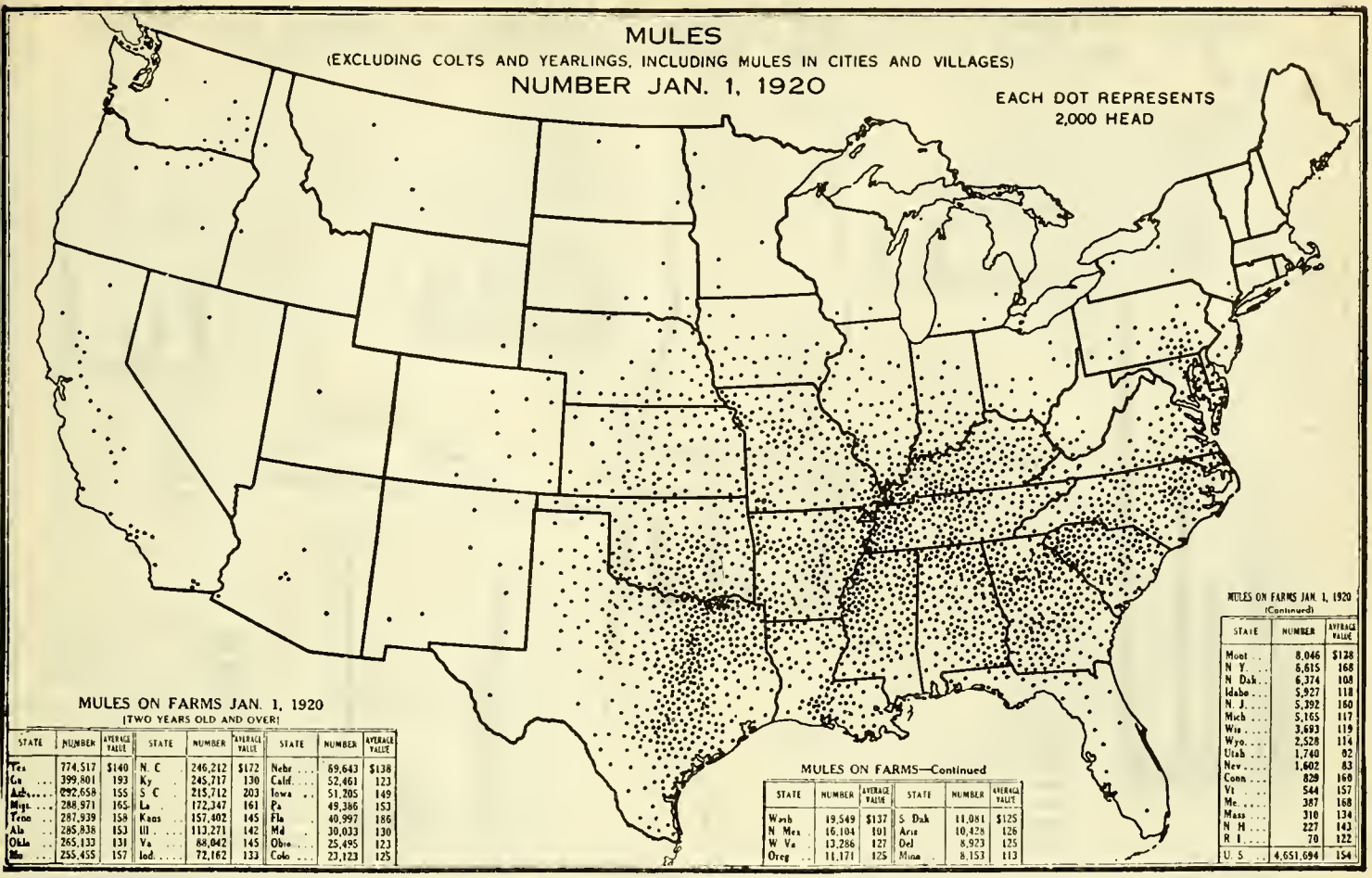
STATE	NUMBER	AV. VALUES	STATE	NUMBER	AV. VALUES
Iowa	1,198,799	$99	Ind.	646,228	$97
Ill.	1,135,918	97	Wis.	628,241	101
Kans.	903,999	85	Okla.	616,794	87
Tex.	888,034	87	Mich.	563,813	96
Minn.	825,935	95	N. Y.	510,329	148
Nebr.	809,172	83	Mont.	507,479	86
Mo.	787,591	89	Pa.	476,040	123
Ohio	742,012	100	Calif.	363,806	93
N. Dak.	713,010	94	Ky.	346,898	100
S. Dak.	661,800	80	Colo.	335,129	86

HORSES ON FARMS, JAN. 1, 1920—Continued

STATE	NUMBER	AV. VALUES	STATE	NUMBER	AV. VALUES
Tenn.	287,228	$117	Oreg.	223,702	$79
Va.	283,086	109	Miss.	192,221	112
Wash.	255,328	92	N. C.	164,810	130
Idaho	227,334	94	La.	159,431	93
Ark.	226,872	100	W. Va.	154,238	109

HORSES ON FARMS—Cont.

STATE	NUMBER	AV. VALUES
N. Mex.	151,416	$58
Wyo.	144,407	69
Md.	129,349	102
Ala.	118,931	116
Ariz.	112,530	49
Utah	99,909	87
Ga.	95,678	136
Me.	90,724	172
S. C.	73,700	152
Vt.	72,709	138
N. J.	70,876	134
Mass.	48,965	155
Nev.	38,735	65
Conn.	37,196	140
N. H.	36,694	138
Fla.	35,500	123
Del.	26,161	80
R. I.	6,348	149
U. S.	17,235,645	97



MULES ON FARMS JAN. 1, 1920
(TWO YEARS OLD AND OVER)

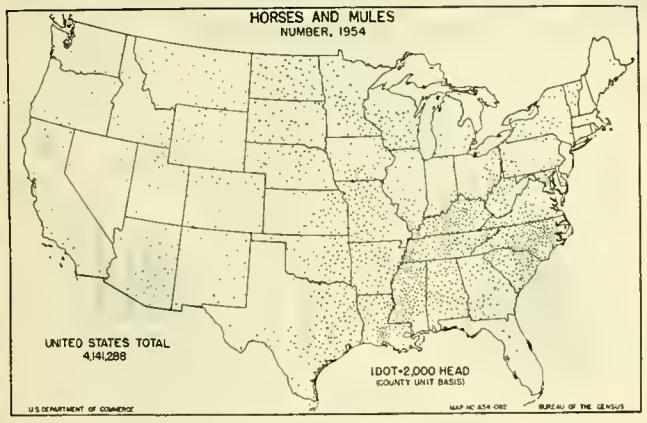
STATE	NUMBER	AVERAGE VALUE	STATE	NUMBER	AVERAGE VALUE	STATE	NUMBER	AVERAGE VALUE
Tex	774,517	$140	N. C	246,212	$172	Nebr	69,643	$138
Ga	399,801	193	Ky	245,717	130	Calif.	52,461	123
Ark	292,658	155	S. C	215,712	203	Iowa	51,205	149
Miss.	288,971	165	La	172,347	161	Pa	49,386	153
Tenn	287,939	158	Kans	157,402	145	Fla	40,997	186
Ala	285,838	153	Ill	113,271	142	Md	30,033	136
Okla	265,133	131	Va	88,042	145	Ohio	25,495	123
Mo	255,455	157	Ind.	72,162	133	Colo	23,123	125

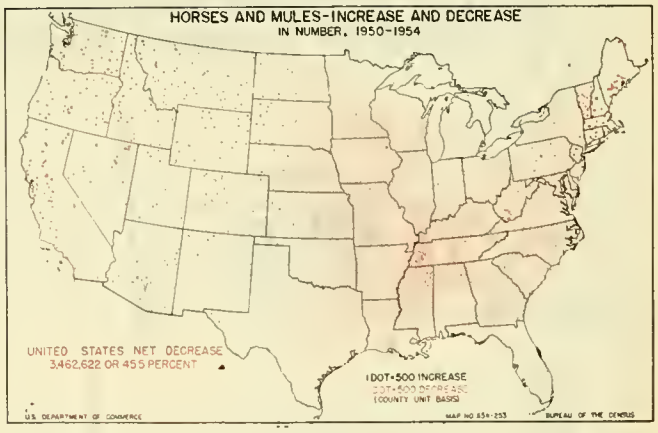
MULES ON FARMS—Continued

STATE	NUMBER	AVERAGE VALUE	STATE	NUMBER	AVERAGE VALUE
Wash	19,549	$137	S. Dak	11,081	$125
N. Mex	16,104	101	Ariz	10,428	126
W. Va	13,286	127	Del	8,923	125
Oreg	11,171	125	Minn	8,153	113

MULES ON FARMS JAN. 1, 1920
(Continued)

STATE	NUMBER	AVERAGE VALUE
Mont	8,046	$128
N. Y.	6,615	168
N. Dak.	6,374	108
Idaho	5,927	118
N. J.	5,392	160
Mich	5,165	117
Wis.	3,693	119
Wyo.	2,528	114
Utah	1,740	92
Nev.	1,602	83
Conn.	829	168
Vt.	544	157
Me.	387	168
Mass.	310	134
N. H.	227	142
R. I.	70	122
U. S.	4,651,694	154

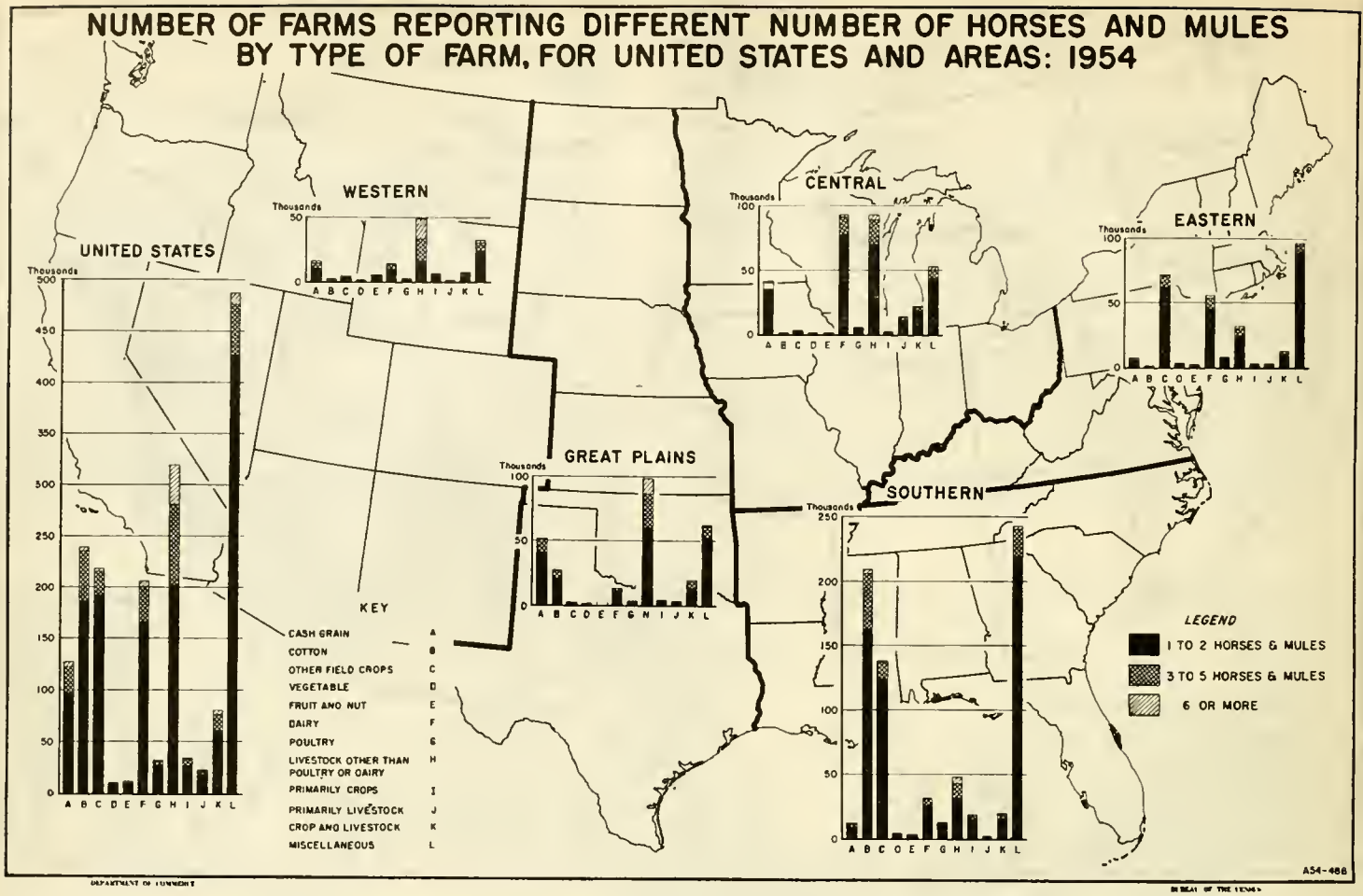


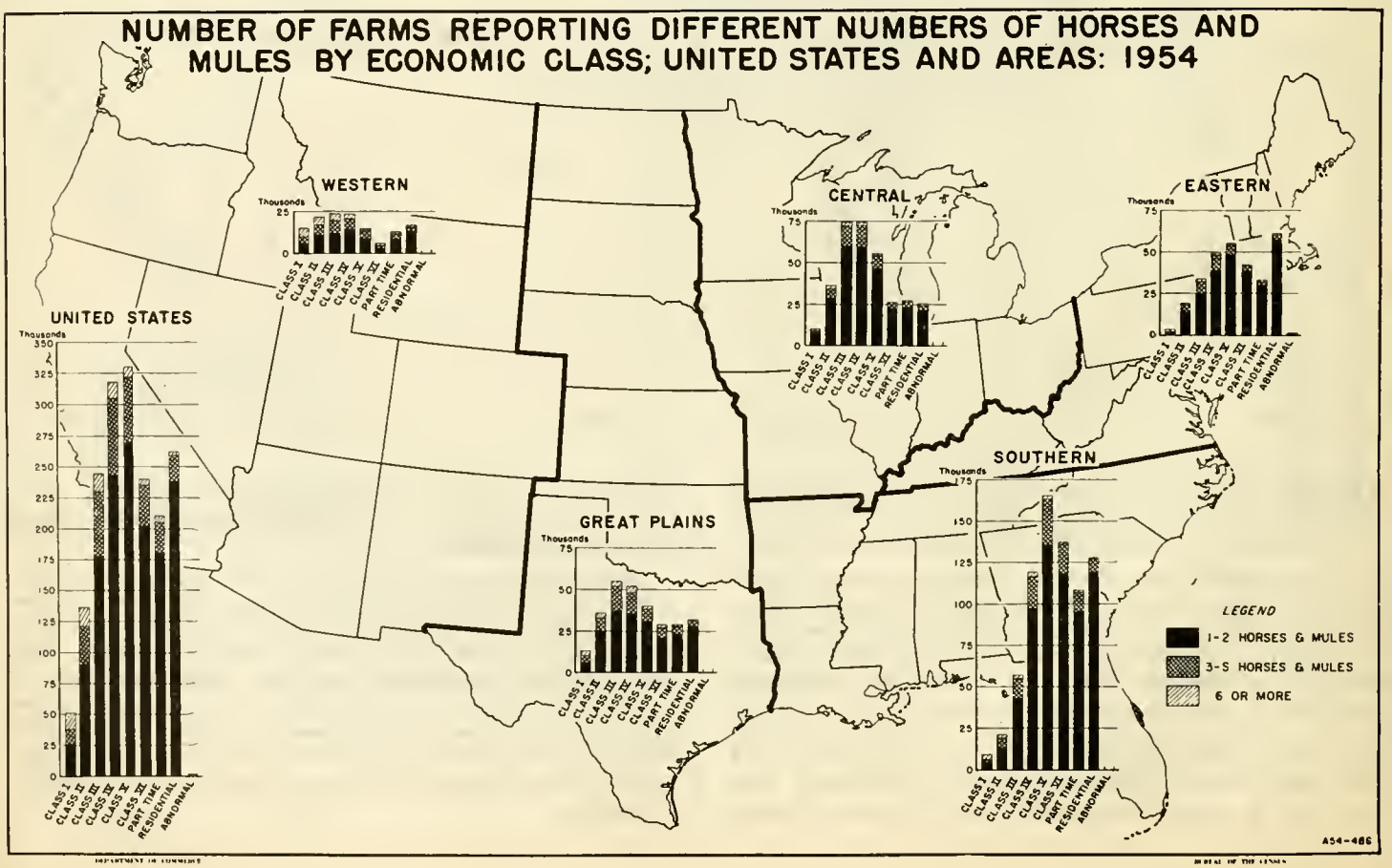


HORSES AND MULES BY TYPE AND ECONOMIC CLASS OF FARM

Of the 1.8 million farms reporting horses and mules in November 1954, 80 percent reported having only 1 or 2 head. These were reported in all five areas, but were especially numerous in the southern area. Certainly the horses and mules on these farms play a very minor role in our present day agricultural production. Farms with three or more horses or mules were relatively numerous in the Southern, Great Plains, and Western areas. Large proportions of the farms having two or more head were cotton farms in the southern region, and livestock other than dairy or poultry farms in the Great Plains and Western regions where forage crops and range lands are prevalent. Many dairy farms in the Central and Eastern States still have one or more horses or mules.

Some farms in each economic class, including those with sales of $25,000 or over reported horses and/or mules. Many of these animals are saddle horses, or old animals which will not be replaced as they die off. This is true in all five areas shown. However, very few farmers in any class group, in any region, reported more than 1 or 2 animals. It is apparent from the wide distribution of the 4 million head of horses and mules among all farm types, economic classes, and size-of-farm groups that few commercial farmers depend to any great extent on animal power for farmwork.


NUMBER OF FARMS REPORTING DIFFERENT NUMBER OF HORSES AND MULES BY TYPE OF FARM, FOR UNITED STATES AND AREAS: 1954
UNITED STATES
WESTERN
CENTRAL
EASTERN
GREAT PLAINS
SOUTHERN
Thousands
A B C D E F G H I J K L
KEY
CASH GRAIN A
COTTON B
OTHER FIELD CROPS C
VEGETABLE D
FRUIT AND NUT E
DAIRY F
POULTRY G
LIVESTOCK OTHER THAN POULTRY OR DAIRY H
PRIMARILY CROPS I
PRIMARILY LIVESTOCK J
CROP AND LIVESTOCK K
MISCELLANEOUS L
LEGEND
1 TO 2 HORSES & MULES
3 TO 5 HORSES & MULES
6 OR MORE
A54-486

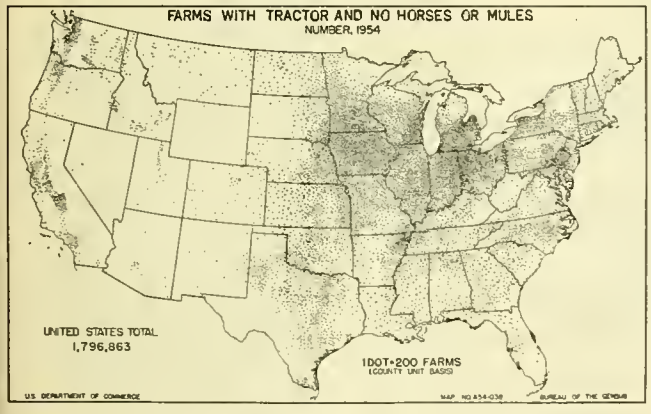

NUMBER OF FARMS REPORTING DIFFERENT NUMBERS OF HORSES AND MULES BY ECONOMIC CLASS; UNITED STATES AND AREAS: 1954
UNITED STATES
WESTERN
CENTRAL
EASTERN
GREAT PLAINS
SOUTHERN
Thousands
CLASS I
CLASS II
CLASS III
CLASS IV
CLASS V
CLASS VI
PART TIME
RESIDENTIAL
ABNORMAL
LEGEND
1-2 HORSES & MULES
3-5 HORSES & MULES
6 OR MORE
A54-486

DISPLACEMENT OF WORK STOCK BY MOTOR VEHICLES

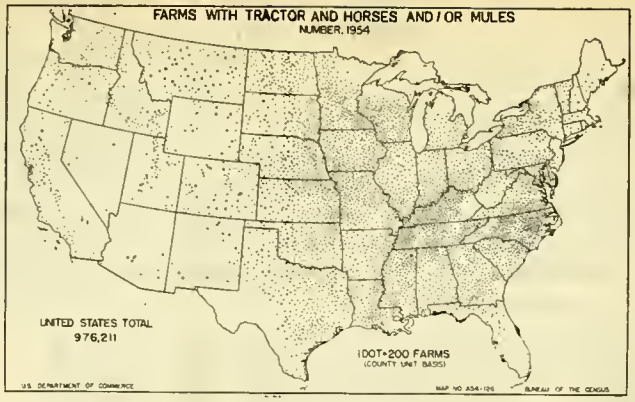
After the coming of the gas tractor, year after year more and more farmers gradually disposed of all work stock. Yet, as late as 1940, only 4 percent of all farmers reported tractors and no horses or mules. By November 1954, the number of farms reporting tractors only, had increased to 38 percent of all farms. Another large group of farmers having tractors still retained some horses or mules. This group constituted about one-fifth of all farms in both 1940 and 1954. Together, these 2 groups of what may be called tractor farms comprised 58 percent of all farms in 1954 compared with 23 percent in 1940. The remaining 42 percent were farms with horses or mules only, or farms without tractors, or horses or mules, as shown by the following data:

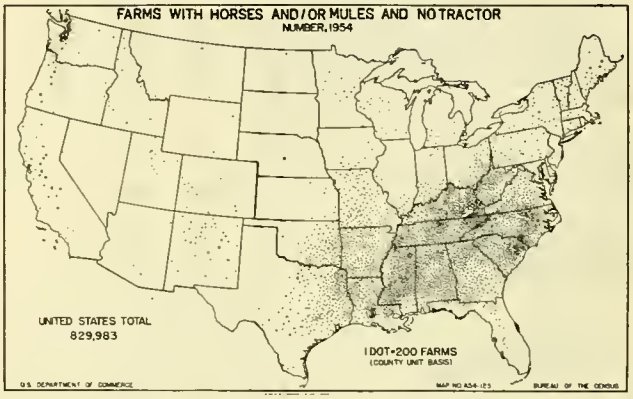
	1940	1954
Percentage of all farms reporting tractors and no horses and/or mules	4	38
Percentage of all farms reporting both tractors and horses and/or mules	19	20
Percentage of all farms reporting horses and/or mules but no tractors	53	17
Percentage of all farms reporting no tractors and no horses and/or mules	24	25

Farms with tractors and no work stock were most heavily concentrated in the better agricultural areas where much of the land is suited for crop production and where land values per farm are high. Such areas in the Western States predominate in the intensive dairy-, fruit-, and vegetable-producing areas. In the East, tractor farms with no horses or mules are most numerous in the Corn Belt and Lake States areas, and in western New York, southeastern Pennsylvania, and the New Jersey, Maryland, and Virginia vegetable-growing areas. Parts of the Mississippi Delta and eastern Great Plains areas reported large numbers of tractor farms with no horses or mules. Farms with



tractors and work stock in 1954 were well scattered throughout the agricultural areas, but the heaviest concentrations were in portions of the southeastern States, particularly in the tobacco and general farming areas. It is in such areas that animal power still is used to some extent for farmwork. Retention of horses or mules on many of the larger farms in this group is probably a matter of personal likes of the operators, and does not reflect a low degree of mechanization. More than three-quarters of a million farms reported horses or mules and no tractors in 1954. About 62 percent of these were in the 10 Appalachian and Southeastern States, where many of the farms are small commercial, residential, and part-time places. One of the unusual features of agricultural production is that about 1.2 million farms reported no tractors, horses, or mules in 1954.





These farms are located very largely in the eastern half of the United States, and are most numerous in the Southeastern States. Farms without tractors or work animals were heavily concentrated in the Mississippi River Delta. Many of these are operated by sharecroppers who own none of the equipment with which the places are operated. Such farmers had use of tractor or animal power, or both, reported by the "home farm." Many other farmers in this class, because of size or type of farm, operated their places without owning either tractors or work animals. Those who needed such power undoubtedly hired their work performed. Operators of greenhouses and some commercial poultry enterprises who cultivate little or no land may not need to own tractors or work stock. Fruit farmers in some areas, and other farmers too, hire all of their field work done.

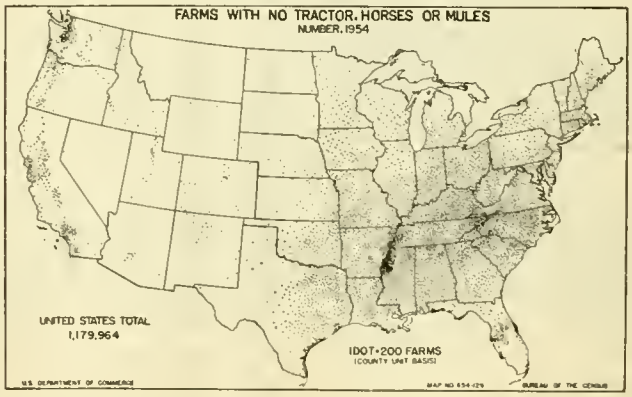


Table 18.—NUMBER OF FARMS, AND FARMS REPORTING BY NUMBER OF HORSES AND MULES REPORTED, BY ECONOMIC CLASS OF FARM, AND BY TYPE OF FARM, FOR THE UNITED STATES AND AREAS: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Area and item	All farms, number (000)	Farms reporting horses and/or mules by number reported			
		None (000)	1 or 2 (000)	3 to 5 (000)	6 or more (000)
United States	4,806	3,013	1,426	291	76
ECONOMIC CLASS					
Total	4,806	3,013	1,426	291	76
Commercial farms	3,352	2,034	1,007	245	67
Class I	136	84	26	13	13
Class II	443	307	90	31	15
Class III	726	482	177	53	14
Class IV	821	503	243	62	13
Class V	769	439	269	53	8
Class VI	458	218	202	33	4
Other farms	1,453	979	419	46	9
TYPE OF FARM					
Total	4,806	3,013	1,426	291	76
Cash-grain farms	547	419	98	25	5
Cotton farms	528	287	187	49	5
Other field-crop farms	373	154	193	23	3
Vegetable farms	33	23	9	1	(a)
Fruit-and-nut farms	86	74	9	2	(a)
Dairy farms	554	348	167	34	6
Poultry farms	157	125	29	3	1
Livestock farms other than dairy and poultry	694	374	202	79	39
General farms	342	203	106	26	7
Primarily crop	78	44	27	6	2
Primarily livestock	65	42	18	4	1
Crop and livestock	199	118	61	16	4
Miscellaneous and unclassified farms	1,491	1,004	427	49	11
Eastern area	779	481	252	37	8
ECONOMIC CLASS					
Total	779	481	252	37	8
Commercial farms	477	274	165	32	6
Class I	17	14	1	1	1
Class II	62	43	14	4	1
Class III	95	61	25	7	2
Class IV	110	61	38	10	1
Class V	117	62	48	6	1
Class VI	76	33	38	4	(a)
Other farms	302	207	87	6	1
TYPE OF FARM					
Total	779	481	252	37	8
Cash-grain farms	26	18	6	1	(a)
Cotton farms	1	(a)	(a)	----	(a)
Other field-crop farms	125	53	61	9	1
Vegetable farms	7	5	2	(a)	(a)
Fruit-and-nut farms	11	9	2	(a)	(a)
Dairy farms	146	90	45	9	2
Poultry farms	49	41	7	1	(a)
Livestock farms other than dairy and poultry	58	26	24	6	2
General farms	42	22	15	4	1
Primarily crop	9	6	3	(a)	(a)
Primarily livestock	7	4	2	1	(a)
Crop and livestock	26	12	10	3	(a)
Miscellaneous and unclassified farms	313	216	89	6	2
Southern area	1,477	733	624	104	15
ECONOMIC CLASS					
Total	1,477	733	624	104	15
Commercial farms	918	411	409	85	13
Class I	17	8	4	3	3
Class II	39	18	13	6	3
Class III	99	43	43	12	2
Class IV	228	109	96	19	3
Class V	313	148	135	27	2
Class VI	222	85	118	18	1
Other farms	558	322	215	19	2
TYPE OF FARM					
Total	1,477	733	624	104	15
Cash-grain farms	26	14	8	3	1
Cotton farms	413	204	163	42	3
Other field-crop farms	222	85	124	13	1
Vegetable farms	8	4	3	(a)	(a)
Fruit-and-nut farms	16	13	2	1	(a)
Dairy farms	47	16	26	5	1
Poultry farms	35	22	12	1	(a)
Livestock farms other than dairy and poultry	77	29	32	12	5
General farms	61	19	33	7	2
Primarily crop	29	10	15	3	1
Primarily livestock	3	1	2	(a)	(a)
Crop and livestock	29	9	16	3	1
Miscellaneous and unclassified farms	571	328	220	21	3
Central area	1,366	1,037	267	51	11
ECONOMIC CLASS					
Total	1,366	1,037	267	51	11
Commercial farms	1,090	814	223	45	8
Class I	37	27	8	2	1
Class II	193	156	28	6	2
Class III	316	242	60	12	2
Class IV	273	199	60	13	2
Class V	188	133	46	8	2
Class VI	84	57	22	4	1
Other farms	276	223	44	4	3
TYPE OF FARM					
Total	1,366	1,037	267	51	11
Cash-grain farms	269	228	34	5	1
Cotton farms	12	11	1	(a)	----
Other field-crop farms	8	5	3	(a)	----
Vegetable farms	8	6	1	(a)	----
Fruit-and-nut farms	7	6	1	(a)	(a)
Dairy farms	288	195	77	14	2
Poultry farms	38	33	5	(a)	(a)
Livestock farms other than dairy and poultry	316	223	70	19	4
General farms	139	102	31	5	1
Primarily crop	10	8	2	(a)	(a)
Primarily livestock	43	29	11	2	1
Crop and livestock	87	65	18	3	1
Miscellaneous and unclassified farms	282	228	44	6	3
Great Plains area	761	475	206	62	18
ECONOMIC CLASS					
Total	761	475	206	62	18
Commercial farms	574	349	155	53	17
Class I	26	13	6	3	3
Class II	86	50	25	8	3
Class III	149	94	37	15	3
Class IV	148	96	35	13	3
Class V	105	66	31	7	2
Class VI	60	32	20	6	2
Other farms	187	126	51	9	1
TYPE OF FARM					
Total	761	475	206	62	18
Cash-grain farms	182	129	40	11	1
Cotton farms	91	64	20	6	1
Other field-crop farms	6	4	2	(a)	(a)
Vegetable farms	3	2	1	(a)	(a)
Fruit-and-nut farms	1	1	(a)	(a)	----
Dairy farms	31	18	10	3	(a)
Poultry farms	13	10	3	(a)	----
Livestock farms other than dairy and poultry	177	79	60	26	12
General farms	68	42	18	7	2
Primarily crop	12	9	3	1	(a)
Primarily livestock	10	7	2	1	(a)
Crop and livestock	45	26	13	5	1
Miscellaneous and unclassified farms	188	127	51	9	1
Western area	423	286	77	36	24
ECONOMIC CLASS					
Total	423	286	77	36	24
Commercial farms	293	186	55	30	22
Class I	38	23	6	4	5
Class II	62	40	11	6	5
Class III	67	42	12	8	4
Class IV	63	39	14	7	4
Class V	46	31	10	4	2
Class VI	17	11	3	2	1
Other farms	130	100	21	6	2
TYPE OF FARM					
Total	423	286	77	36	24
Cash-grain farms	45	30	9	4	2
Cotton farms	11	8	2	(a)	(a)
Other field-crop farms	11	7	3	1	(a)
Vegetable farms	7	6	1	(a)	(a)
Fruit-and-nut farms	50	45	4	1	(a)
Dairy farms	43	29	9	4	1
Poultry farms	22	20	2	(a)	(a)
Livestock farms other than dairy and poultry	66	17	16	16	16
General farms	32	18	8	3	2
Primarily crop	17	11	4	1	(a)
Primarily livestock	2	1	1	(a)	(a)
Crop and livestock	12	6	4	2	1
Miscellaneous and unclassified farms	137	105	22	7	2

(a) Less than 500.

HARVEST MACHINES

Adaptable and versatile tractor power has supplied the real force back of the development and improvement of field machinery suitable for our many types and sizes of farms. The harvest machines discussed in this report are those for which the Bureau of the Census has reported information on numbers and farms reporting. Including are grain combines, corn pickers, pick-up balers, and field forage harvesters. These are timesaving machines which enable the farmers to do better harvest jobs, especially under emergency conditions when timeliness of operation is most essential. Generally, they enable 1 man or a small crew, to do the work done by 2 or more men under harvest conditions prevailing about the time of World War I. They have enabled farmers to reduce the hours of labor used to harvest an acre or ton of product, and to do the work faster and easier. The labor savings of these machines over older harvest methods are indicated by the following data:

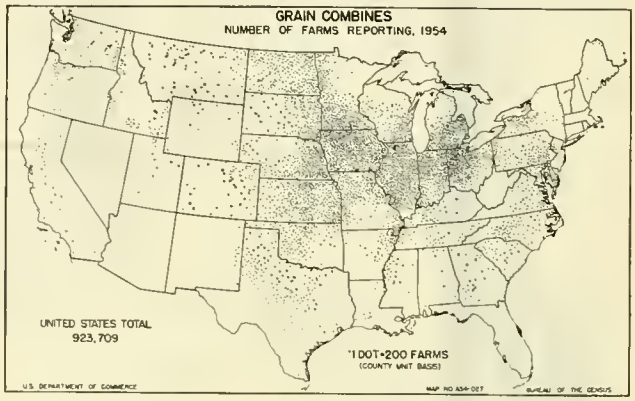
Item and area	Man-hours used by—	
	Old harvest method	New harvest method
WHEAT in the Great Plains.	6 hours per acre. Cut with binder, shocked, and threshed from shock.	1.5 hours per acre. Combined from standing grain.
CORN in the Corn Belt.	8.2 hours per acre. Harvested by hand from standing stalk.	2.8 hours per acre. Harvested with mechanical picker from standing stalk.
HAY in the Central States.	2.8 hours per ton. Handled from windrow to storage with hay loader and power fork.	2 hours per ton. Handled from windrow to storage with automatic-tie pick-up baler and tractor trailer.
HAY in the Central States.	2.8 hours per ton. Same method as above.	1.1 hours per ton. Handled from windrow to storage with pick-up chopper and motortruck.

GRAIN COMBINES

The first grain combine was built in Michigan before the middle of the 19th century. After a decade of limited use, it was not considered a success under eastern conditions and it was shipped to California. Its use under California conditions was encouraging and in 1880 factory production of combines was initiated there.

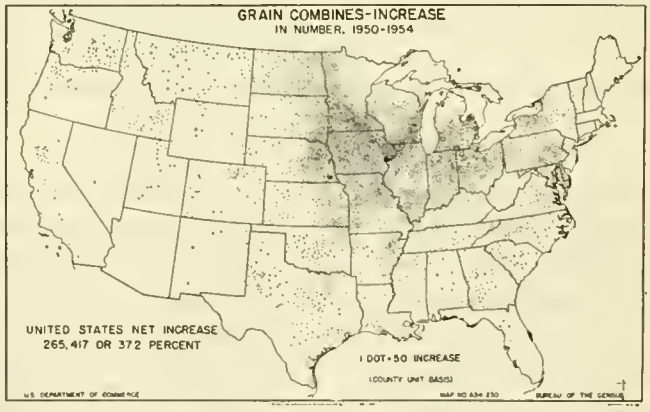
The first combines were of large size, with a cutting width up to 35 feet. They were pulled principally with large teams (as many as 40 horses) and were traction powered. Prior to World War I, combines were used almost exclusively in the Pacific Coast States and Idaho. Smaller combines, adapted for use with gas tractors, and equipped with mounted engines came into use during World War I. With the new combines, the combine method of harvesting small grains soon became popular in the Plains and Mountain States. Gradually, the use of combines spread into the more humid areas of the United States. Small combines, some with a cutting width of about 40 inches, were first developed around 1930. The small combines are usually operated with tractor power take-off. During World War II the self-propelled combine came into use and has proved quite popular.

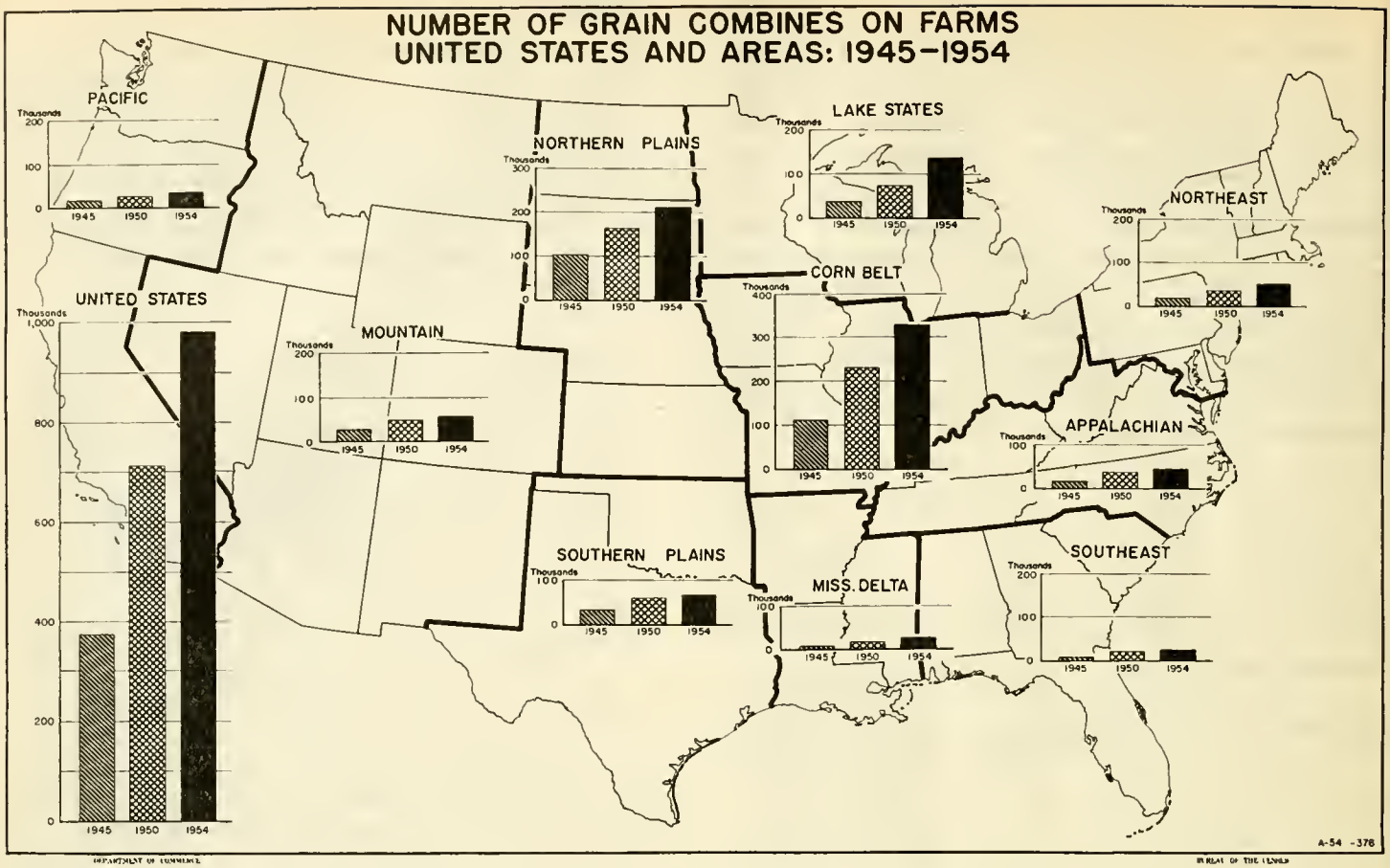
In November 1954, the number of farms reporting grain combines and number of combines reported was greater than for any previous year. The 989,000 combines of that date were located on 934,000 farms. Modern combines are used primarily to harvest small grains, flax, soybeans, sorghums, and grass and legume seeds, and are concentrated in areas where these crops are grown commercially. About half of the farms with combines in 1954 were located in the Central area and about one-fourth were located in the Great Plains area. Together, the Western, Southern and Eastern States had only about a fourth of the farms reporting combines. In the humid areas of the country, combines tend to be smaller in size than they are in the Great Plains and the Western regions where grain fields and grain acreage per farm are large.



Between April 1950 and November 1954, the number of combines increased from 714,000 to 989,000. Although increases occurred throughout the grain areas, almost 80 percent of the total increase was in the Corn Belt, Northern Plains, and Lake States. Increases were greatest in the northern and western areas of the Corn Belt and in the southern portions of the Lake States. It is principally in these areas that the binder-thresher method of harvesting small grain has decreased less rapidly than elsewhere. In many of the areas where combines have shown substantial increases since 1950 a considerable portion of the small grain acreage is combined from the windrow.

On a county basis, some localities showed reductions in numbers of combines between 1950 and 1954. Most of the counties reporting reductions in numbers are in the Southern and Central Plains, where recent small grain production declined because of reduced plantings and severe drought.

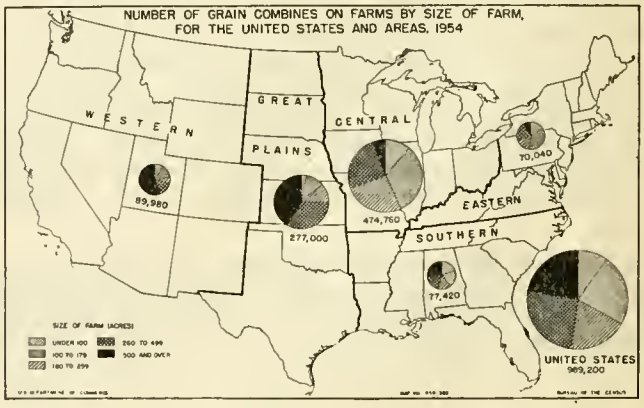


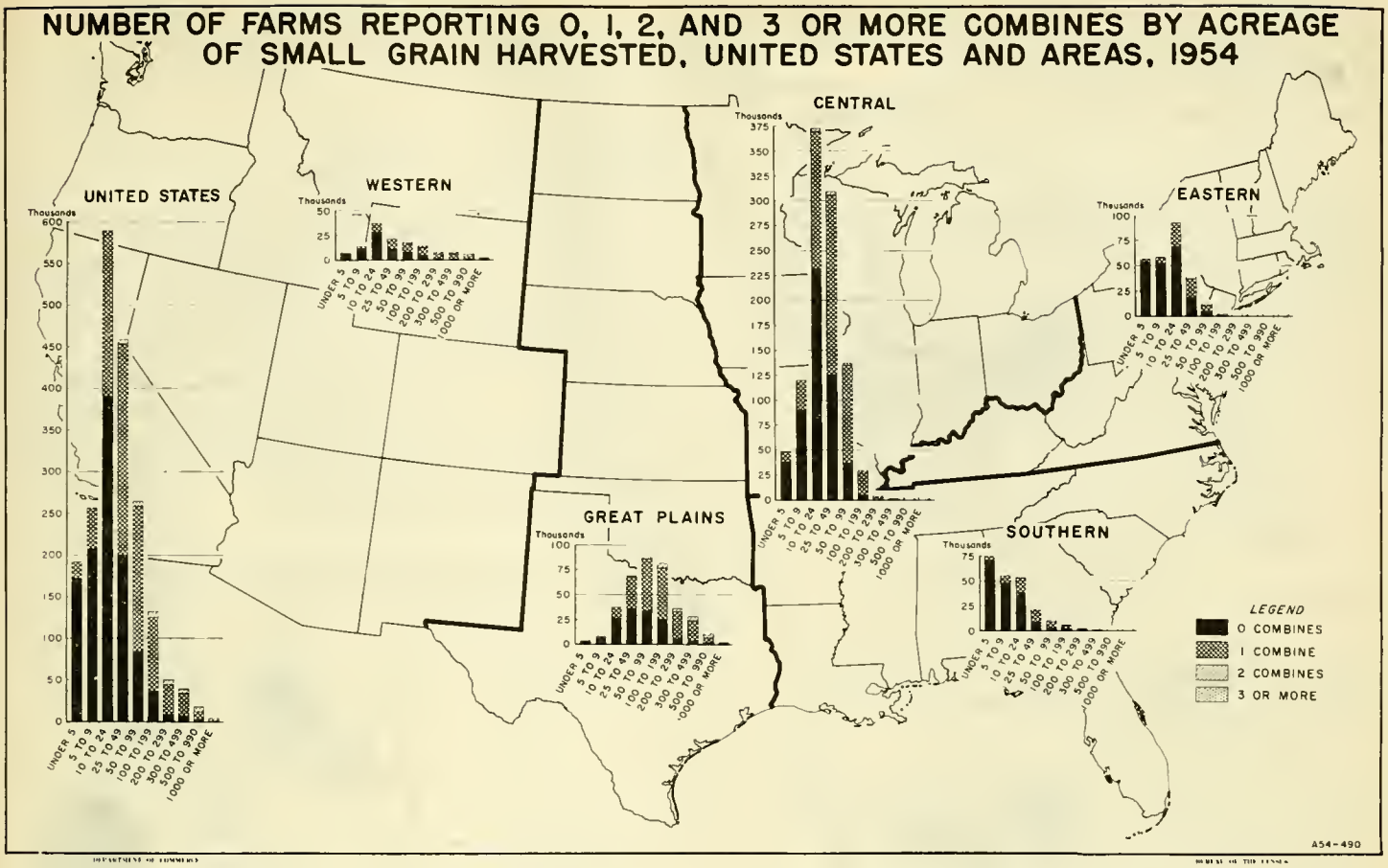


Although factory production of combines started around 1880, the number on farms as late as 1920 probably did not exceed 4,000 and most of these were in the Pacific Coast States. In 1930, the Pacific Coast, Mountain, Northern Plains, and Southern Plains States together had 96 percent of the 61,000 combines then on farms. By 1945 the number in the United States had increased to 375,000 and by November 1954 to 980,000. During this period of approximately 10 years, the number of combines increased by about 160 percent. A part of the increase reflected a further rapid spread of the combining method of harvesting small grains and soybeans in the central, eastern and southern areas, where increases in numbers of combines was about 200 percent. Since 1950, increases in numbers has continued relatively heavy in the Northern Plains, the Lake States, the Corn Belt, the Northeast and the Mississippi Delta States. In the other regions, the rate of increase has been less in recent years.

GRAIN COMBINES BY SIZE OF FARM

Although crops suitable for combining are widely produced throughout the United States, the major commercial areas are the important wheat growing areas of the Great Plains and Western States, and the small feed grains, bread grains, and soybean producing areas of the Central States. Smaller commercial producing areas of barley, dry beans, dry peas, sorghums, grass and legume seeds, and other crops suitable for combining are located with the limits of 1 or more of these 3 areas. As a group, the farmers in this area had 85 percent of all the combines on farms in November 1954. About three-fourths of the total number were located in the Plains and Central States. In general, grain combines tend to be concentrated on farms in the larger size groups. This is especially true in the Great Plains and Western areas where grain farms are numerous and usually relatively large. The number of combines indicate only a part of the total picture of combine use, for these harvest machines vary greatly in size and harvesting capacity. Many of the combines in the Great Plains and Western regions where acreages per farm are large are more than 10 feet in size. In the irrigated areas, and in the humid areas east of the Great Plains, most combines are 5 and 6 feet in size.





About one-fifth of all farms in the United States reported having one or more combines in 1954. Because of the wide range in size of combines most farmers can buy a size suitable for the work to be done. Few farmers own more than 1 combine. Many of those reporting more than 1 combine were farms having at least 100 acres of small grain, and were located in the Great Plains area.

Estimates made by the United States Department of Agriculture show that grain combines were used to harvest almost 63 percent of the total small grain acreage of 1945, 84 percent of the acreage of 1950, and more than 90 percent of the small grain acreage harvested in 1954. Farmers have bought substantially more combines since World War II. Much of the increase was east of the Great Plains area where many of the combines are of the small sizes, and acreage per combine is less than in the specialized wheat areas. These changes resulted in an average decrease in acres of all small grain per combine from 297 acres in 1945 to 112 acres in 1954.

CORN PICKERS

Early settlers arriving in the New World soon discovered that for a long time corn had been an important food of the Indians. Since then, corn production has spread into most countries of the world, but so well adapted to its production are our soils and climate that our farmers alone produce about 60 percent of the world crop. Our corn acreage has grown with the growth of the Nation—from 34 million acres in 1866 to a peak of 117 million acres in 1917. Now, about 1 in 4 acres of land planted to crops is in corn.

Although the first patents for a field-type corn picker were issued around 1850, it was not until 1910 that pickers on farms reached the 1,000 mark, according to estimates by the United States Department of Agriculture. Ten years later the number had increased to 10,000. All of the early corn pickers were one-row traction-operated machines. Use of pickers made little headway until about 1928, when the tractor power take-off was first adapted for use with them. Two-row pickers came into use about the same time. With these improvements, farmer's use of the corn picker began to increase. By November 1954, corn pickers were reported by 684,000 farmers.

Corn harvest was a long, tiresome job before the mechanical picker came into general use. Estimates of the United States Department of Agriculture show that in 1913, 40 percent of the corn acreage for grain was cut, shocked, and husked, much of it by hand, and nearly all of the remaining 60 percent was harvested by hand from the standing stalk. In recent years, little of the corn acreage is cut, shocked, and husked, and probably as much as three-fourths of the acreage is harvested with mechanical pickers. The mechanical harvester has reduced the time required to harvest and crib an acre of corn in the Corn Belt from about 8 hours when harvested from standing stalk by hand to less than 3 hours when harvested with mechanical picker.

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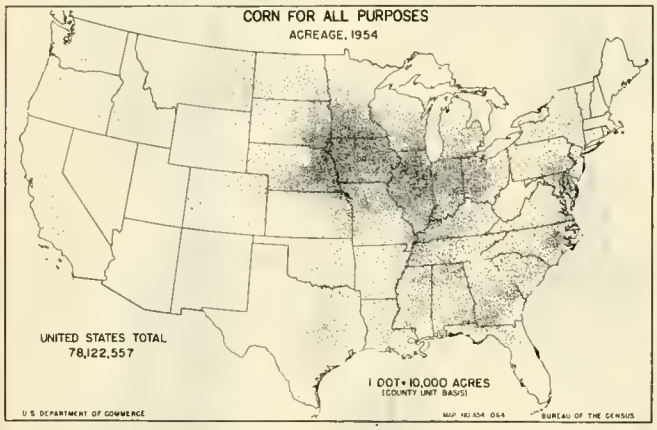
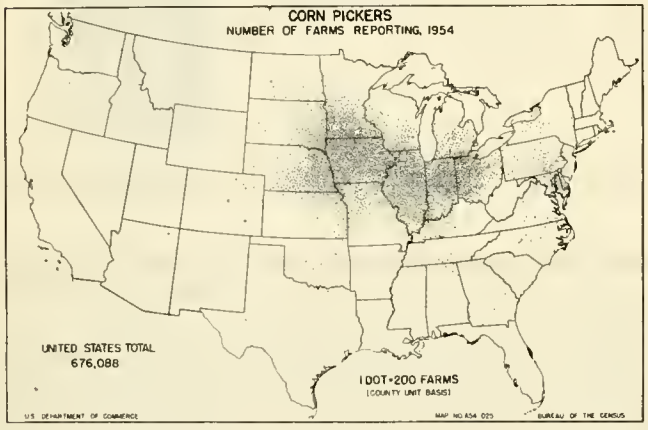
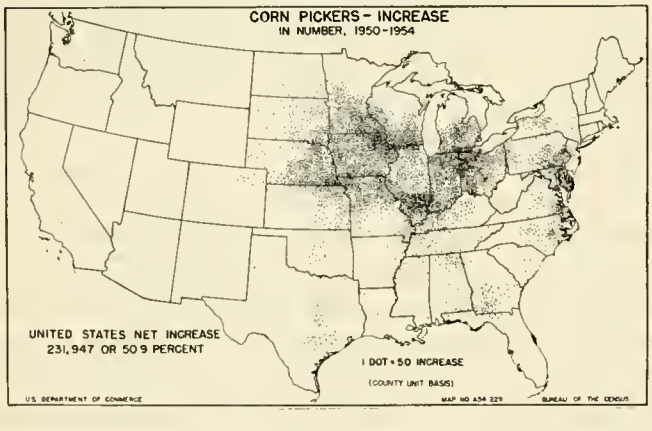
Much of the total corn acreage is in the Corn Belt, Lake States, and in eastern South Dakota and Nebraska, although some corn is grown in all areas where the climate is suitable.

As the number of corn pickers on farms increased by about 50 percent between 1950 and 1954, many of those reported in 1954 were of recent manufacture. Most (70 percent) of the corn pickers are concentrated in the important corn-producing area of the Corn Belt and Lake States. The use of pickers is spreading into other areas as the commercial corn acreage increases. In the Southeast area the number of pickers increased by 400 percent between 1950 and 1954, but the total number in that region in 1954 was less than 10,000.

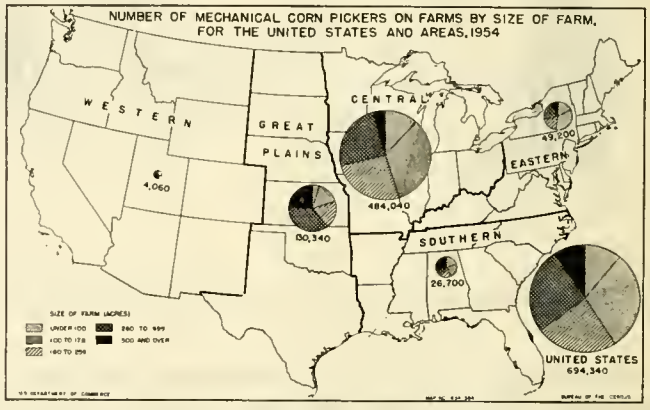




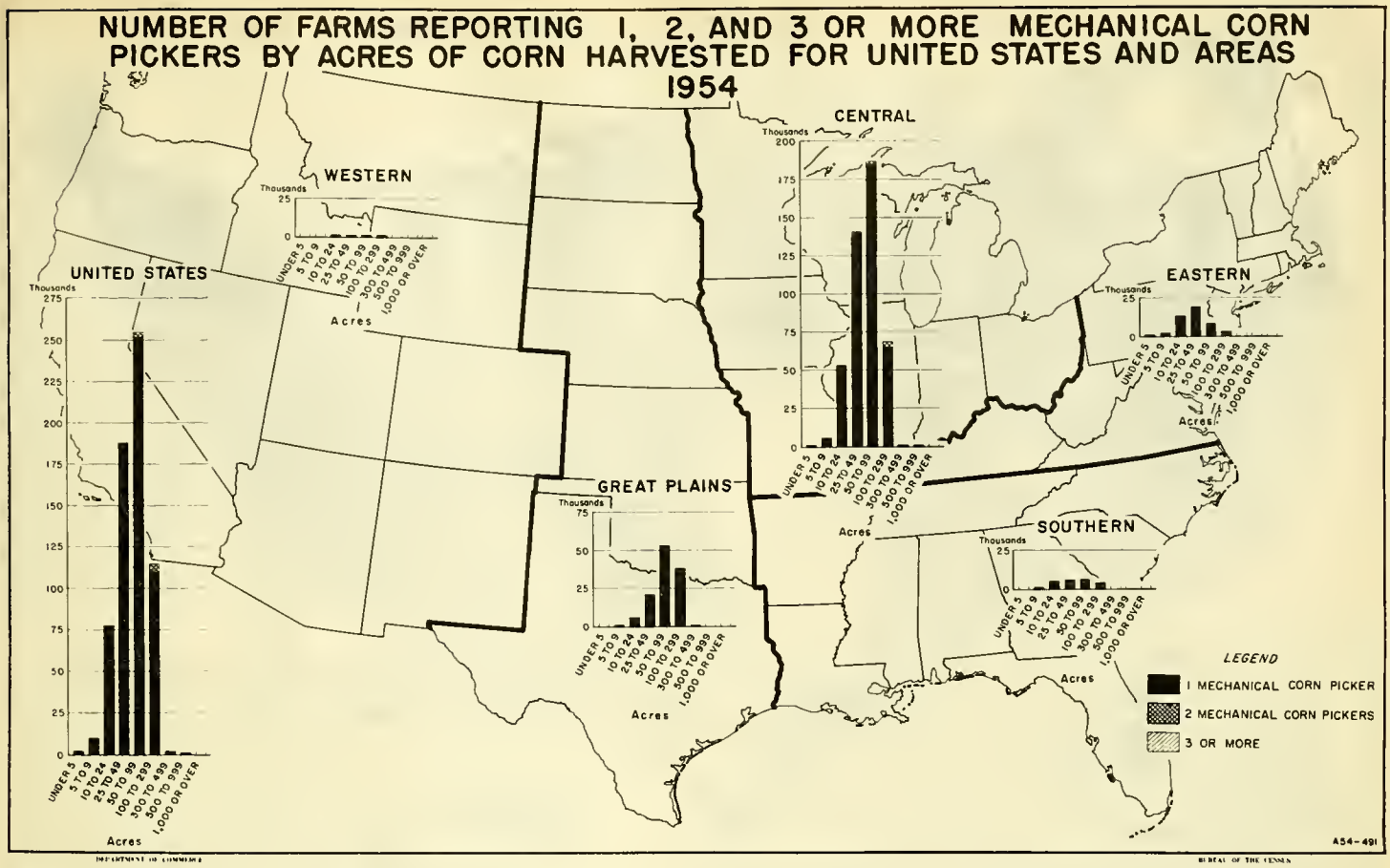


NUMBER OF CORN PICKERS BY SIZE OF FARM

The Central States, with 70 percent of the corn pickers in 1954, completely dominate the general pattern of picker distribution. In this important corn-producing region, pickers were reported on many small and medium sizes of farms, but the outstanding size group contained farms ranging in size from 100 to 179 acres. In the eastern and southern areas, about half the corn pickers were on farms containing more than 100 acres of land. In the Great Plains and Western regions relatively large proportions of the corn pickers were reported on the larger farms, or those having more than 260 acres.



In 1954 more than two-thirds of all farms reporting corn pickers had from 25 to 99 acres of corn. Nearly all of these farms had only one corn picker. In fact, only 2 percent of all farms reporting corn pickers in 1954 had more than 1 picker. Corn harvest seasons vary in length, primarily because of variations in weather conditions. When corn was picked by hand the harvest season in central Illinois usually extended from about the middle of October to the middle of December. When the first killing frost was late, or fall rains were unusually heavy the season might be so delayed that the corn harvest was extended into January. As mechanical pickers came into use farmers in the Corn Belt were able to shorten the picking season and to complete the job before severe winter weather. Many of the pickers now on farms normally are used a short period on the home farm and then are used to harvest corn for other farmers, some of whom have more corn acreage than can be harvested by their picker during good weather. Under good harvest conditions a 1-row picker can harvest up to 200 acres, and a 2-row picker can harvest up to 400 or 450 acres per season. Many pickers actually are used to harvest only a fourth or a third of these acreages.



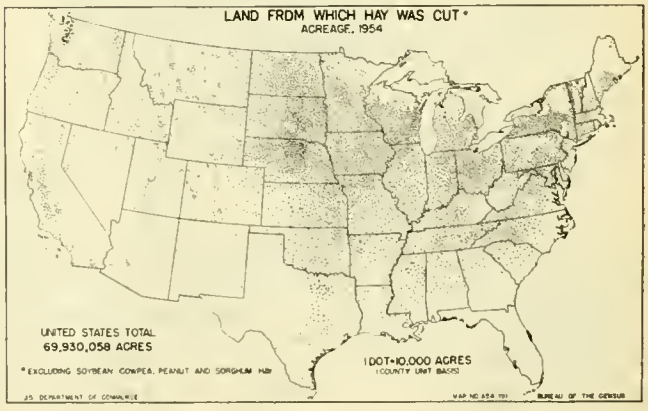
PICK-UP BALERS

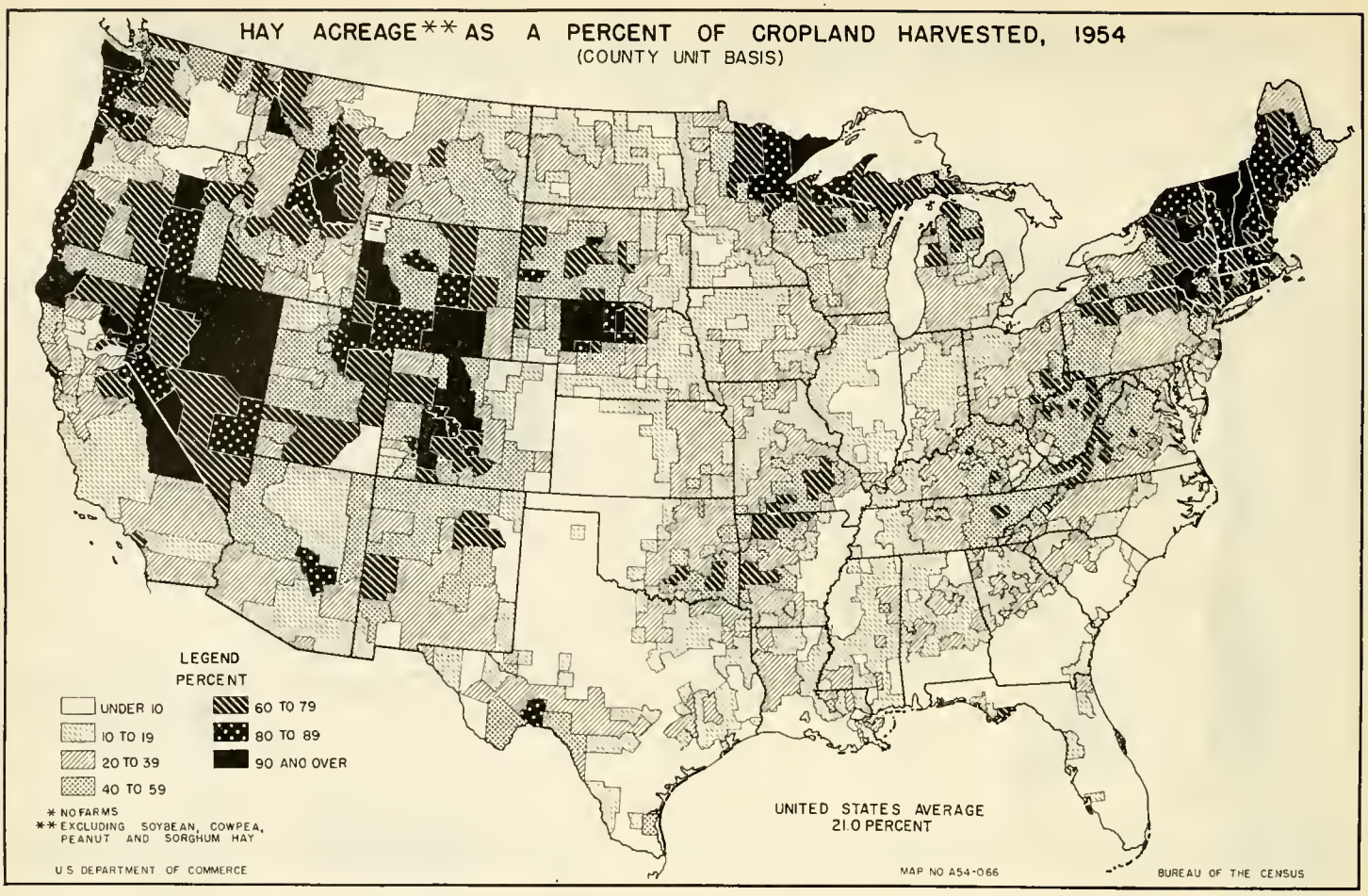
Hay crops are widely grown and represent one-fifth of all harvested crop acreage in the United States. This extensive acreage, which normally yields in excess of 100 million tons of hay, provides a big harvesting job.

Hay acreage is concentrated mainly in or adjacent to the dairy, beef cattle, and sheep-producing areas of the country. In some areas where the hay acreage is small in relation to land area, it makes up a large part of the total cropland harvested. In these areas, soil and climatic conditions are not suitable for extensive production of crops other than hay and grass. For example, in eastern Minnesota and northern Wisconsin, 80 to 90 percent of the cropland harvested in 1954 was in hay. In the southern parts of these States where corn and small grains are grown extensively, less than 40 percent of the cropland harvested was represented by land from which hay was cut. High proportions of the harvested cropland are in hay also in the colder portions of the Northeastern States, and in some of the irrigated areas of the Mountain and Western States.

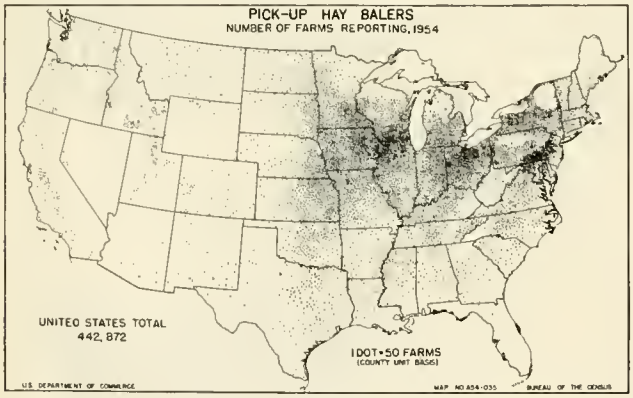
The practice of baling hay began about the middle of the 19th century when a simple press operated by animal power was used. Steam power was first used to operate stationary hay presses, or balers, around 1885. These early balers were used primarily for baling both hay and straw from stacks and mows for shipment to cities and other off-farm places for use as feed for horses and mules, and some cattle.

The first baler for picking up and baling hay or straw from the windrow in the field was introduced around 1930. This early pick-up baler required manual tying and required a crew of 3 or 4 men for operation. Its use in the hay field eliminated the handling of loose hay at both harvest and feeding time. The baled hay requires less storage space than loose hay, and the bales facilitate the hauling and stacking in sheds, and in fields where rainfall is not a problem. About 10 years later the automatic-tie pick-up baler became a reality. This type of baler used twine for tying and was operated by one man. Savings in manpower was a big factor in the subsequent rapid increase in farms reporting pick-up balers. From 1950 to 1954 the number of farms reporting pick-up balers increased from 192,000 to 443,000. Since some farmers had more than one baler in both years, the increase in number of balers was somewhat greater than the number of farms reporting.

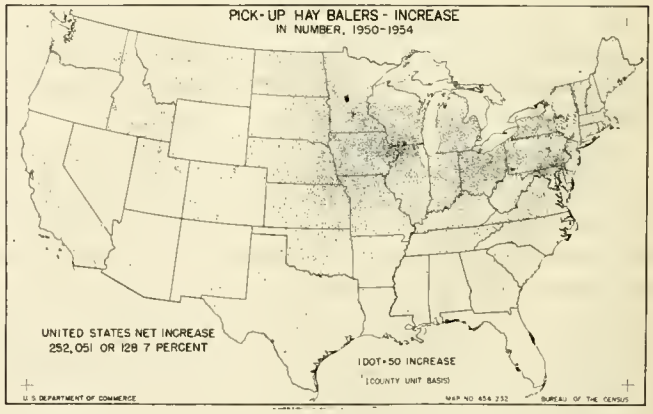


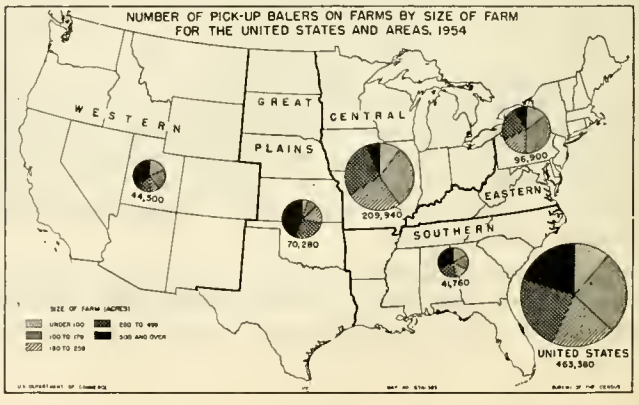


The nationwide distribution pattern of pick-up balers resembles the distribution pattern of the hay acreage. The greater part of the increase in number of balers between 1950 and 1954 occurred in areas of heavy hay concentration. In the area comprising Wisconsin, Minnesota, and Michigan the increase was nearly 200 percent.



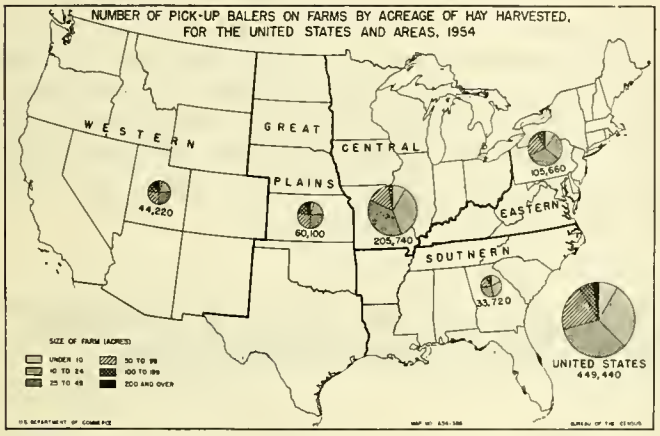
The pick-up baler is well adapted for customwork since it can handle a fairly large hay acreage during the haying season. Many owners of balers who have only average tonnages of hay on their farms do some baling for their neighbors. In this way the owner increases the use of and lowers the annual cost of his baling, and enables other small farmers to harvest and feed their hay in baled form. In November 1954, about 11 percent of the pick-up balers were reported by farmers having farms of less than 100 acres. More than half of all farms are in this size





group. Another 46 percent of the pick-up balers were on farms ranging in size from 100 to 260 acres. These farms are most numerous in the Central and Eastern States and many of the livestock farms are in this size group. More than half of the pick-up balers reported in the Southern region were on farms of 260 or more acres in size. In the Great Plains and Western areas, large numbers of balers were reported on ranches and farms with 500 or more acres of land.

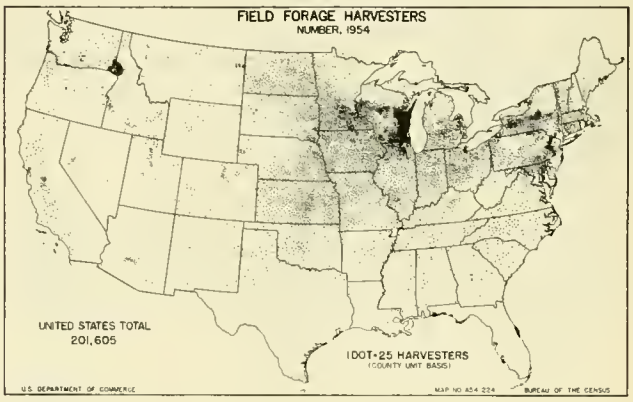
Harvested hay acreage is a better indicator of need for a baler than is total acres of land in the farm. When the farms are segregated by acres of hay, and numbers of pick-up balers reported, the data show that many farmers with 10 to 25 acres of hay have pick-up balers. For example, about 8 percent of all pick-up balers were reported by farmers who harvested less than 10 acres of hay on their own farms, and more than a third of the balers were owned by farmers who reported less than 25 acres of hay. Undoubtedly many such farmers did custom baling and some of them may have owned their balers jointly with other farmers. About 90 percent of all pick-up balers were reported by farmers who had less than 100 acres of hay. This group, of course, includes the majority of farms in the United States. In the Great Plains and Western areas about half of the balers were reported on farms having more than 50 acres of hay.



FIELD FORAGE HARVESTERS

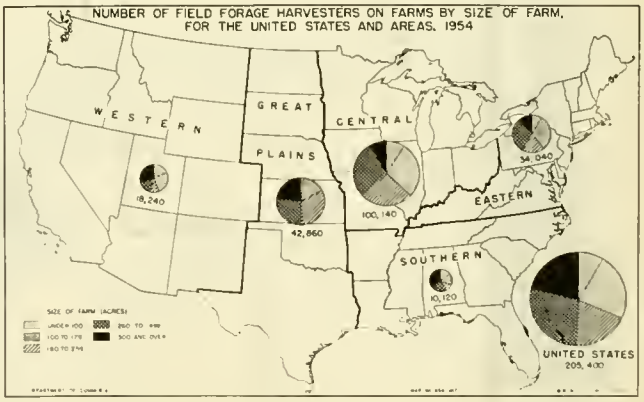
Harvesting of corn and other green crops for silage is a slow, tiresome job when the crops are cut by hand or with a binder, loaded by hand or elevator, and unloaded into the silage cutter by hand. For many years farmers looked to the time when this heavy job could be made easier. Finally, the field forage harvester, a machine that cuts and chops green forage crops into desirable lengths as it is driven over the field, brought the long-sought solution of the problem. The first field forage harvesters were used around 1920, almost exclusively for harvesting row crops, mainly corn for silage. In time the field forage harvester was improved and equipped with attachments for doing several jobs. Many of the harvesters on farms in 1954 were equipped to harvest row crops, cut and chop standing grass and legume crops, and to pick up and chop from the windrow such crops as hay and straw.

Field chopping as of today is a relatively quick, easy, labor-saving way of harvesting forage crops. The increase in the use of this machine has been rapid since World War II. According to estimates of the United States Department of Agriculture there were about 81,000 field forage harvesters on farms in 1950. By November 1954 over 200,000 were reported on farms. Although the field forage harvester is distributed throughout all farming areas, the heavy concentrations are in the principal dairy areas where chopping corn and grass for silage is common. In some areas the machine is used to some extent for chopping grass for green feed and for chopping hay.



Harvest machines, like the field forage harvester, require relatively large investments. Economic use of such machines depends largely on the volume of crops to be harvested year after year. On many of the larger farms there are adequate quantities of crops for their use. But many farmers with limited acreages on their own farm find it desirable to do contract work for others or to own such machines jointly with one or more other farmers. In November 1954, half of all forage harvesters reported by farmers were on farms of less than 260 acres in size. These farms of less than 260 acres represent about 73 percent of all farms in the United States. Farms between 260 and 500 acres in size had 28 percent of all forage harvesters in 1954.

Geographically, farmers in the central area reported almost half of the forage harvesters in 1954. Concentration was particularly heavy in the eastern dairy area of Wisconsin. More than 80 percent of the forage harvesters reported in the central area were on farms between 100 and 500 acres in size. In the Eastern States many of the smaller dairy farms have a large proportion of their crop acreage in corn and grass for silage. Almost 40 percent of the forage harvesters in this area were reported by farmers having less than 180 acres of land, while in the Great Plains area less than 7 percent of the forage harvesters were on farms of this size. In both the Great Plains and Western areas almost a fourth of the forage harvesters were on farms of 1,000 or more acres.



Estimates by the United States Department of Agriculture show the extent to which mechanical harvesting of hay has replaced old hay harvesting methods. In 1944, for example, about 27 percent of the entire hay tonnage was baled, 2 percent was chopped, and 71 percent was handled as long loose hay. Pick-up baling and field chopping increased markedly during the next 10 years. In 1954, about 73 percent of the hay was baled, 7 percent was chopped, and only 20 percent was handled in long loose form. Much of the present long loose hay is in the low rainfall areas of the Great Plains and some Western States where large quantities of wild hay and alfalfa are stacked for cattle and sheep feeding. Only in a few areas is much of the hay chopped. The field forage harvester is used primarily for harvesting forage crops for silage.

PERCENTAGE OF HAY HARVESTED BY DIFFERENT METHODS, UNITED STATES FOR SPECIFIED YEARS[1]

Year	Percentage of speeified hay erop that was—		
	Baled	Chopped	Stored as loose long hay
Crop of 1944	26.8	1.7	71.5
Crop of 1948	47.5	5.6	46.9
Crop of 1951	61.7	7.5	30.8
Crop of 1954	72.5	7.2	20.3

[1] "Harvesting Hay and Straw and Use of Balers" F. M. 107, United States Department of Agriculture, June 1953, and "Harvesting Hay and Straw" ARS 43-27, United States Department of Agriculture, May 1956.

COMBINATIONS OF HARVEST MACHINES

The larger, specialized harvest machines, like pick-up balers, forage harvesters, etc., require a considerable investment, especially on farms where more than one kind of a machine is necessary. High investment and the operating costs for such machines undoubtedly influence many farmers to contract for their use or to arrange with neighbors for exchange of machine work. In 1954, for example, only 157,000 farmers reported having one or more of each kind of the 3 harvest machines, grain combine, corn picker, and pick-up baler, although many hundreds of thousands of farmers harvested crops which could be harvested by these machines. Nearly all of the farmers (96 percent) who had all 3 kinds of these machines were in 4 type-of-farming groups, namely cash-grain, livestock other than dairy or poultry, dairy, and general farming. These are the types of farms growing relatively large acreages of small grains, corn, and hay. For the most part, the farms of these types are in the higher economic class groups. Seventy percent of all farmers reporting all 3 harvest machines, and 60 percent of those reporting 2 of the 3 machines were located in the important grain and livestock areas of the Corn Belt and Lake States. Most of these farms were in Economic Classes I, II, III, and IV.

In all economic classes of farms, in all 5 areas, some farmers did not have any of the 3 machines, grain combines, corn pickers, or pick-up balers. For the United States as a whole, nearly 63 percent of the farmers had none of the machines. These farmers were especially numerous in the Southern area where 90 percent of all farms did not have a grain combine, a corn picker, or a pick-up baler in 1954. Of course, some farms do not have these machines because they are not needed for the type of farming followed. In many other cases, however, the farmer has so little work for them that he cannot afford them. This does not mean necessarily that combines, corn pickers, and pick-up balers are not used on the smaller farms. Operators of small farms frequently engage a neighboring farmer to combine his small grain, machine pick his corn, or bale his hay.

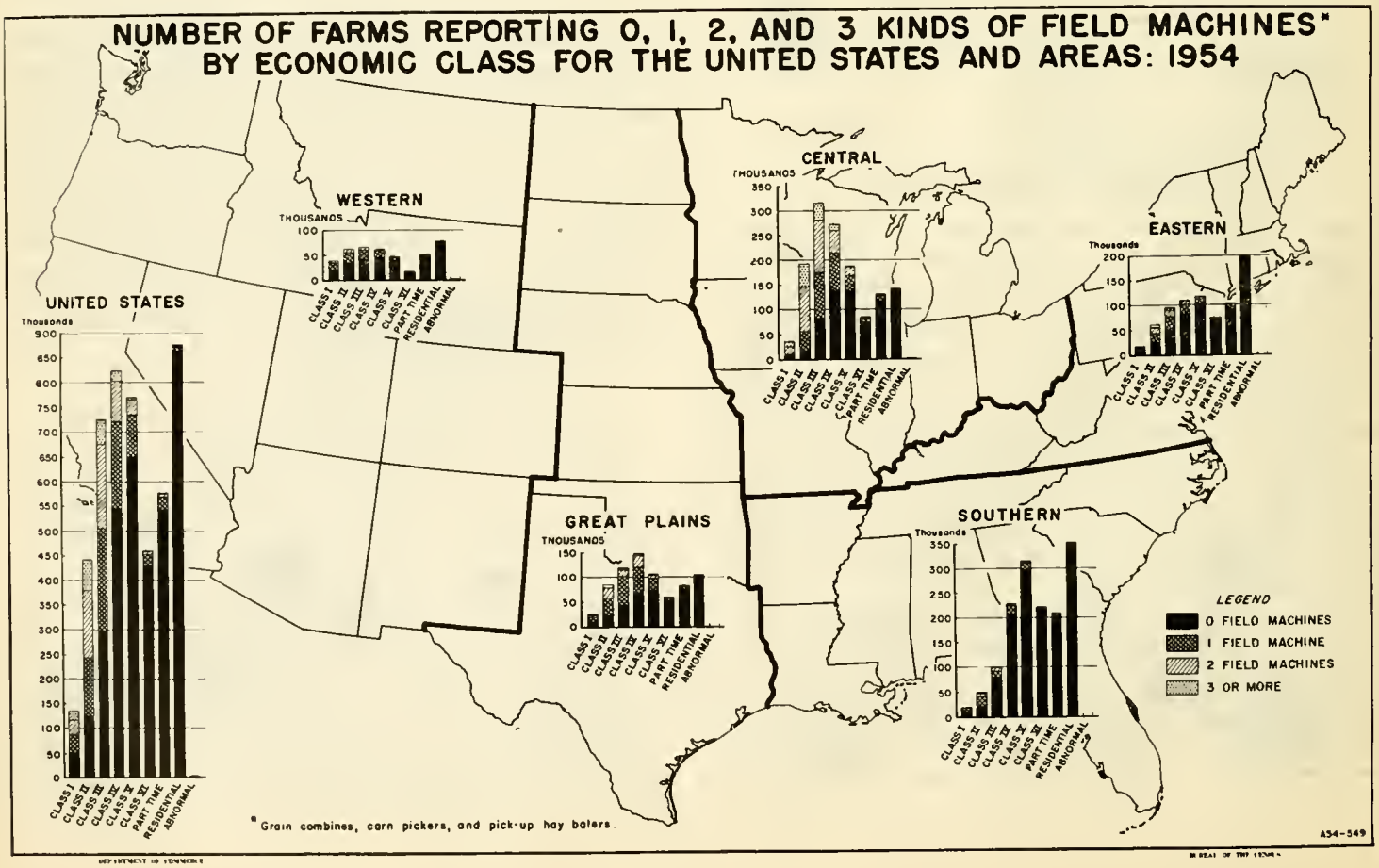


Table 19.—Number of Farms, and Farms Reporting and Number of Grain Combines, by Size of Farm, for the United States: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Size of farm	All farms		Grain combines				
			Farms reporting		Number of grain combines		
	Number (000)	Percent distribution	Number (000)	Percent of all farms	Total (000)	Average number per farm (all farms)	Average number per farm reporting
Total	4.806	100.0	934	19.4	989	0.2	1.1
Under 10 acres	489	10.2	3	.7	3	(*)	1.1
10 to 29 acres	719	15.0	8	1.1	8	(*)	1.0
30 to 49 acres	497	10.4	13	2.5	13	(*)	1.0
50 to 69 acres	348	7.2	15	4.3	15	(*)	1.0
70 to 99 acres	519	10.8	56	10.8	56	.1	1.0
100 to 139 acres	492	10.2	86	17.5	88	.2	1.0
140 to 179 acres	463	9.6	147	31.7	148	.3	1.0
180 to 219 acres	259	5.4	96	36.9	97	.4	1.0
220 to 259 acres	210	4.4	90	43.1	92	.4	1.0
260 to 499 acres	488	10.2	243	49.8	254	.5	1.0
500 to 999 acres	191	4.0	111	57.9	125	.7	1.1
1,000 acres and over	131	2.7	67	51.5	90	.7	1.3

* Less than 0.05 percent.

Table 20.—Number of Farms, and Farms Reporting and Number of Grain Combines, by Tenure of Operator, for Commercial Farms, for the United States: 1954

Data are estimates based upon reports for only a sample, approximately 20 percent of the farms. See text]

Tenure of operator	All farms		Grain combines				
			Farms reporting		Number of grain combines		
	Number (000)	Percent distribution	Number (000)	Percent of all farms	Total (000)	Average number per farm (all farms)	Average number per farm reporting
Total	3,328	100.0	896	26.9	950	0.29	1.06
Full owners	1,594	47.9	326	20.5	339	.21	1.04
Part owners	756	22.7	309	40.9	338	.45	1.09
Managers	18	0.5	5	30.8	7	.41	1.32
All tenants	960	28.8	255	26.6	267	.28	1.05
Cash tenants	95	2.8	20	20.6	20	.21	1.04
Share-cash tenants	160	4.8	92	57.6	95	.60	1.03
Share tenants and croppers	642	19.3	132	20.6	140	.22	1.06
Other and unspecified tenants	63	1.9	11	17.6	12	.18	1.05

Table 21.—Farms Reporting and Acreage of Small Grains Harvested, and Number of Grain Combines, by the Acreage of Small Grains Harvested, for the United States and Areas: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Area and acres of small grains harvested	Small grains harvested		Grain combines			
			Farms reporting		Number	
	Farms reporting (000)	Acres (000)	Number (000)	Percent of farms reporting small grains	Total (000)	Per farm reporting
United States, total	2,010	109,158	905	45.0	956	1.1
Farms by acres of small grain harvested:						
Under 10 acres	447	2,259	70	15.6	71	1.0
10 to 49 acres	1,054	25,184	464	44.0	474	1.0
50 to 99 acres	264	17,767	180	68.0	186	1.0
100 to 199 acres	132	18,081	96	72.4	103	1.1
200 to 499 acres	91	27,367	76	83.8	90	1.2
500 acres and over	22	18,499	20	90.0	32	1.6
Eastern area	263	4,323	66	24.9	68	1.0
Farms by acres of small grain harvested:						
Under 10 acres	116	549	10	8.2	10	1.0
10 to 49 acres	133	2,749	46	34.8	48	1.0
50 to 99 acres	12	742	8	67.6	9	1.1
100 to 199 acres	2	252	2	83.5	2	1.3
200 to 499 acres	(*)	31	(*)	80.0	(*)	2.0
500 acres and over						
Southern area	225	5,013	54	24.3	59	1.1
Farms by acres of small grain harvested:						
Under 10 acres	130	560	13	10.0	13	1.0
10 to 49 acres	74	1,433	27	37.2	29	1.0
50 to 99 acres	10	672	7	66.9	8	1.2
100 to 199 acres	6	781	4	63.4	4	1.1
200 to 499 acres	4	1,151	3	79.2	4	1.5
500 acres and over	1	416	(*)	57.1	1	2.0
Central area	1,024	32,175	499	48.8	512	1.0
Farms by acres of small grain harvested:						
Under 10 acres	170	979	42	24.7	43	1.0
10 to 49 acres	683	16,644	326	47.7	332	1.0
50 to 99 acres	137	8,885	102	74.2	104	1.0
100 to 199 acres	29	3,676	24	84.8	26	1.1
200 to 499 acres	6	1,452	5	92.4	6	1.2
500 acres and over	1	539	1	91.4	1	2.0
Great Plains area	363	49,710	223	61.6	244	1.1
Farms by acres of small grain harvested:						
Under 10 acres	11	60	3	26.3	3	1.0
10 to 49 acres	106	3,098	45	42.3	46	1.0
50 to 99 acres	88	6,248	54	61.8	56	1.0
100 to 199 acres	81	11,358	56	69.6	60	1.1
200 to 499 acres	65	19,534	54	83.5	63	1.2
500 acres and over	12	9,412	11	89.0	17	1.5
Western area	135	17,938	62	45.8	73	1.2
Farms by acres of small grain harvested:						
Under 10 acres	20	112	2	11.4	2	1.0
10 to 49 acres	58	1,260	19	33.2	20	1.0
50 to 99 acres	18	1,220	9	52.6	10	1.1
100 to 199 acres	15	2,015	10	66.2	11	1.1
200 to 499 acres	16	5,198	14	82.9	17	1.2
500 acres and over	8	8,132	8	93.6	13	1.7

* Less than 500.

Table 22.—NUMBER OF FARMS, FARMS REPORTING SMALL GRAINS HARVESTED, AND FARMS REPORTING GRAIN COMBINES, FOR THE UNITED STATES AND AREAS: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Item	United States	Area				
		Eastern	Southern	Central	Great Plains	Western
All farms—number (000)	4,806	779	1,477	1,366	761	423
Farms reporting small grains harvested—farms (000)	2,010	263	225	1,024	363	135
Farms reporting both small grains harvested and a grain combine—farms (000)	905	66	54	499	223	62
Number of grain combines on such farms—(000)	956	68	59	512	244	73
Percentage of farms reporting small grains harvested and reporting—						
No grain combine—percent	55.0	75.1	75.7	51.2	38.4	54.2
1 grain combine—do	42.8	24.0	22.4	47.6	56.8	39.3
2 grain combines—do	2.0	0.8	1.6	1.1	4.2	5.4
3 or more grain combines—do	.2	(*)	.2	(*)	.6	1.2

* Less than 0.05 percent.

Table 23.—NUMBER OF FARMS, AND FARMS REPORTING AND NUMBER OF CORN PICKERS, BY SIZE OF FARM, FOR THE UNITED STATES: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Size of farm	All farms		Corn pickers				
			Farms reporting		Number of corn pickers		
	Number (000)	Percent distribution	Number (000)	Percent of all farms	Total (000)	Average number per farm (all farms)	Average number per farm reporting
Total	4,806	100.0	684	14.2	694	0.1	1.0
Under 10 acres	489	10.2	2	.4	2	(*)	1.0
10 to 29 acres	719	15.0	5	.8	5	(*)	1.0
30 to 49 acres	497	10.4	10	1.9	10	(*)	1.0
50 to 69 acres	348	7.2	11	3.1	11	(*)	1.0
70 to 99 acres	519	10.8	46	8.9	47	.1	1.0
100 to 139 acres	492	10.2	74	15.0	74	.2	1.0
140 to 179 acres	463	9.6	133	28.7	134	.3	1.0
180 to 219 acres	259	5.4	86	33.0	86	.3	1.0
220 to 259 acres	210	4.4	79	37.8	80	.4	1.0
260 to 499 acres	488	10.2	176	36.0	180	.4	1.0
500 to 999 acres	191	4.0	46	23.9	48	.2	1.0
1,000 acres and over	131	2.7	17	12.9	18	.1	1.1

* Less than 0.05 percent.

Table 24.—FARMS REPORTING AND ACRES OF CORN HARVESTED FOR ALL PURPOSES, AND NUMBER OF FARMS REPORTING CORN PICKERS, FOR THE UNITED STATES AND AREAS: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Area	Corn harvested		Corn pickers			
			Farms reporting		Number	
	Farms reporting (000)	Acres (000)	Number (000)	Percent of farms reporting corn	Total (000)	Per farm reporting
United States, total	2,818	78,623	652	231	662	1.02
Farms by acres of corn harvested:						
Under 10 acres	1,038	4,926	12	1.2	12	1.00
10 to 49 acres	1,282	28,678	266	20.8	268	1.01
50 to 99 acres	359	24,363	255	71.2	258	1.01
100 to 299 acres	136	18,663	115	84.5	120	1.04
300 to 499 acres	3	1,029	2	74.1	3	1.36
500 acres and over	1	964	1	62.1	1	1.76
Eastern area	457	6,142	46	10.1	47	1.02
Farms by acres of corn harvested:						
Under 10 acres	263	1,137	3	1.0	3	1.00
10 to 49 years	176	3,397	32	18.3	32	1.01
50 to 99 acres	14	873	8	56.1	8	1.01
100 to 299 acres	4	499	3	85.3	4	1.13
300 to 499 acres	(*)	55	(*)	75.0	(*)	1.33
500 acres and over	(*)	181	(*)	35.3	(*)	1.33
Southern area	962	13,500	23	2.4	24	1.02
Farms by acres of corn harvested:						
Under 10 acres	515	2,427	1	0.3	2	1.00
10 to 49 acres	409	7,594	11	2.8	12	1.03
50 to 99 acres	29	1,907	6	21.0	6	1.00
100 to 299 acres	9	1,267	4	43.3	4	1.05
300 to 499 acres	1	240	(*)	52.9	(*)	1.11
500 acres and over	(*)	64	(*)	33.3	(*)	1.00

Area	Corn harvested		Corn pickers			
			Farms reporting		Number	
	Farms reporting (000)	Acres (000)	Number (000)	Percent of farms reporting corn	Total (000)	Per farm reporting
Central area	1,029	41,513	458	44.6	466	1.02
Farms by acres of corn harvested:						
Under 10 acres	181	986	7	3.7	7	1.00
10 to 49 acres	535	13,712	194	36.3	195	1.01
50 to 99 acres	235	15,895	188	79.9	190	1.01
100 to 299 acres	76	10,272	69	90.1	72	1.05
300 to 499 acres	1	250	1	88.2	1	1.70
500 acres and over	1	397	1	89.3	1	1.88
Great Plains area	335	16,542	121	36.1	123	1.02
Farms by acres of corn harvested:						
Under 10 acres	65	317	1	1.8	1	1.00
10 to 49 acres	143	3,581	27	18.7	27	1.00
50 to 99 acres	80	5,512	53	66.7	54	1.01
100 to 299 acres	46	6,456	38	83.9	39	1.02
300 to 499 acres	1	453	1	81.0	1	1.25
500 acres and over	(*)	224	(*)	61.5	(*)	1.88
Western area	35	925	3	8.6	3	1.00
Farms by acres of corn harvested:						
Under 10 acres	14	59	(*)		(*)	
10 to 49 acres	18	392	2	9.6	2	1.00
50 to 99 acres	1	175	1	46.3	1	1.00
100 to 299 acres	1	170	1	50.0	1	1.00
300 to 499 acres	(*)	40	(*)	25.0	(*)	1.00
500 acres and over	(*)	98	(*)	20.0	(*)	1.00

* Less than 500.

Table 25.—FARMS REPORTING AND ACRES OF CORN HARVESTED FOR ALL PURPOSES, AND NUMBER OF FARMS REPORTING CORN PICKERS, BY ACRES OF CORN HARVESTED, FOR THE UNITED STATES: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Item	Corn harvested			Farms reporting corn pickers				
	Farms reporting		Acres (1,000)	Total		1 corn picker (1,000 farms)	2 corn pickers (1,000 farms)	3 or more corn pickers (1,000 farms)
	Number (1,000 farms)	Percent distribution		Number (1,000 farms)	Percent of farms reporting corn harvested			
Farms reporting corn harvested by acres harvested:								
Total	2,818	100.0	78,623	652	23.1	641	10	(*)
Under 10 acres	1,038	36.8	4,926	12	1.2	12		
10 to 24 acres	802	28.5	12,134	78	9.7	78	(*)	
25 to 49 acres	480	17.0	16,543	189	39.3	188	1	(*)
50 to 99 acres	359	12.7	24,363	255	71.2	252	3	(*)
100 to 299 acres	136	4.8	18,663	115	84.5	110	5	(*)
300 acres and over	4	.1	1,993	3	70.3	2	1	(*)

* Less than 500.

Table 26.—Number of Farms, and Farms Reporting and Number of Pick-up Balers, by Size of Farm, for the United States: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Size of farm	All farms		Pick-up balers				
			Farms reporting		Number of pick-up balers		
	Number (000)	Percent distribution	Number (000)	Percent of all farms	Total (000)	Average number per farm (all farms)	Average number per farm reporting
Total	4,806	100.0	459	9.6	463	0.1	1.0
Under 10 acres	489	10.2	2	.4	2	(*)	1.0
10 to 29 acres	719	15.0	5	.6	5	(*)	1.0
30 to 49 acres	497	10.4	8	1.6	8	(*)	1.0
50 to 69 acres	348	7.2	8	2.3	8	(*)	1.0
70 to 99 acres	519	10.8	29	5.6	29	.1	1.0
100 to 139 acres	492	10.2	50	10.3	51	.1	1.0
140 to 179 acres	463	9.6	70	15.0	70	.2	1.0
180 to 219 acres	259	5.4	47	18.2	47	.2	1.0
220 to 259 acres	210	4.4	42	20.2	43	.2	1.0
260 to 499 acres	488	10.2	117	24.0	118	.2	1.0
500 to 999 acres	191	4.0	47	24.4	47	.2	1.0
1,000 acres and over	131	2.7	34	26.0	36	.3	1.1

* Less than 0.05.

Table 27.—Number of Farms, and Farms Reporting and Number of Forage Harvesters, by Size of Farm, for the United States: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Size of farm	All farms		Forage harvesters				
			Farms reporting		Number of forage harvesters		
	Number (000)	Percent distribution	Number (000)	Percent of all farms	Total (000)	Average number per farm (all farms)	Average number per farm reporting
Total	4,806	100.0	203	4.2	205	(*)	1.0
Under 10 acres	489	10.2	1	.1	1	(*)	1.0
10 to 29 acres	719	15.0	2	.2	2	(*)	1.0
30 to 49 acres	497	10.4	2	.5	2	(*)	1.0
50 to 69 acres	348	7.2	2	.6	2	(*)	1.0
70 to 99 acres	519	10.8	11	2.0	11	(*)	1.0
100 to 139 acres	492	10.2	20	4.0	20	(*)	1.0
140 to 179 acres	463	9.6	27	6.0	27	0.1	1.0
180 to 219 acres	259	5.4	20	7.5	20	.1	1.0
220 to 259 acres	210	4.4	20	9.4	20	.1	1.0
260 to 499 acres	488	10.2	57	11.6	58	.1	1.0
500 to 999 acres	191	4.0	24	12.7	25	.1	1.0
1,000 acres and over	131	2.7	18	13.8	19	.1	1.0

* Less than 0.05.

Table 28.—NUMBER OF FARMS, FARMS REPORTING AND ACRES OF ALL HAY HARVESTED, AND FARMS REPORTING PICK-UP BALERS, BY ACRES OF HAY HARVESTED AND BY SIZE OF FARM, FOR THE UNITED STATES AND AREAS: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Item	United States	Area				
		Eastern	Southern	Central	Great Plains	Western
All farms—number (000)	4,806	779	1,477	1,366	761	423
Farms reporting hay harvested—farms (000)	2,573	547	460	1,001	356	210
Acres of hay harvested—acres (000)	70,017	11,583	5,438	23,069	19,878	10,049
Farms reporting both hay harvested and pick-up balers—farms (000)	445	105	33	204	59	43
Percent of farms reporting hay harvested	17.3	19.2	7.3	20.4	16.7	20.4
Number of pick-up balers—(000)	449	106	34	206	60	44
Average acres of hay harvested per pick-up baler	155.8	109.6	161.3	112.1	330.7	228.2
Percent of farms with specified acres of hay harvested, reporting pick-up balers:						
Under 10 acres of hay—percent	4.3	4.6	1.9	7.6	4.8	3.1
10 to 24 acres of hay—do	15.2	16.2	9.8	17.2	10.1	16.1
25 to 49 acres of hay—do	28.5	34.8	27.2	29.1	20.8	25.4
50 to 99 acres of hay—do	39.4	52.5	46.6	41.9	25.7	38.0
100 to 299 acres of hay—do	42.1	76.4	57.2	55.0	28.1	38.8
300 acres of hay and over—do	40.6	72.7	68.8	53.8	32.4	47.1
Percent of farms in each size of farm group, reporting pick-up balers:						
Under 10 acres—percent	.4	.6	.2	.1	.2	
10 to 29 acres—do	.6	.5	.4	.1	1.4	1.3
30 to 49 acres—do	1.6	1.9	.7	2.7	1.3	4.6
50 to 69 acres—do	2.3	3.1	.8	4.4	.7	6.4
70 to 99 acres—do	5.6	9.0	1.4	7.0	2.7	14.8
100 to 139 acres—do	10.3	15.3	3.1	12.6	4.3	20.8
140 to 179 acres—do	15.0	25.5	4.0	19.2	4.5	16.0
180 to 219 acres—do	18.2	26.1	6.6	23.1	6.7	20.9
220 to 259 acres—do	20.2	35.3	9.1	24.4	10.0	22.8
260 to 499 acres—do	24.0	41.5	13.9	33.6	13.7	15.5
500 to 999 acres—do	24.4	49.0	27.5	41.1	18.2	16.2
1,000 acres and over—do	30.0	55.2	34.3	51.5	22.1	24.1

Table 29.—NUMBER OF FARMS, AND NUMBER OF FARMS REPORTING 1, 2, OR 3 KINDS [1] OF FIELD MACHINES, BY ECONOMIC CLASS OF FARM, AND BY TYPE OF FARM, FOR THE UNITED STATES AND AREAS: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Item	Number of all farms (000)	Farms reporting, by number of 3 kinds of field machines							
		None		1		2		3	
		Number (000)	Percent of all farms	Number (000)	Percent of all farms	Number (000)	Percent of all farms	Number (000)	Percent of all farms
United States, total	4,806	3,504	72.9	685	14.3	458	9.5	158	3.3
Economic class of farm:									
Commercial farms	3,352	2,096	62.5	648	19.3	451	13.5	157	4.7
Class I	136	51	37.8	39	28.5	28	20.8	17	12.9
Class II	443	125	28.1	119	26.9	136	30.7	63	14.2
Class III	726	299	41.1	207	28.5	169	23.3	51	7.0
Class IV	821	544	66.2	176	21.4	83	10.1	19	2.3
Class V	769	650	84.5	84	10.9	30	3.9	5	.7
Class VI	458	428	93.5	23	5.1	5	1.1	1	.3
Other farms	1,453	1,408	96.9	37	2.5	7	.5	2	.1
Type of farm:									
Cash-grain farms	547	157	28.6	194	35.4	156	28.6	40	7.4
Cotton farms	528	481	91.2	37	6.9	8	1.6	2	.3
Other field-crop farms	373	339	90.9	24	6.4	8	2.3	2	.4
Vegetable farms	33	31	92.5	2	5.8	(2)	1.1	(2)	.5
Fruit-and-nut farms	86	82	95.3	3	3.6	1	.8	(2)	.3
Dairy farms	554	329	59.3	129	23.2	65	11.8	32	5.7
Poultry farms	157	136	86.7	14	8.7	5	3.4	2	1.3
Livestock farms other than dairy and poultry	694	341	49.1	160	23.0	140	20.1	54	7.8
General farms	342	166	48.5	85	24.9	66	19.4	25	7.3
Primarily crop	78	48	62.0	19	25.0	8	10.5	2	2.5
Primarily livestock	65	30	46.9	16	25.4	12	18.8	6	8.9
Crop and livestock	199	87	43.7	49	24.6	46	23.0	17	8.6
Miscellaneous and unclassified farms	1,491	1,443	96.7	39	2.6	8	.5	1	1.2
Eastern area, total	779	638	82.0	84	10.8	39	5.1	17	2.2
Economic class of farm:									
Commercial farms	477	345	72.3	78	16.3	38	7.9	17	3.5
Class I	17	9	51.3	4	21.9	2	13.3	2	13.5
Class II	62	26	41.8	18	28.5	11	18.4	7	11.3
Class III	95	52	54.2	25	26.5	13	14.0	5	5.3
Class IV	110	83	75.8	18	16.7	7	6.0	2	1.5
Class V	117	103	88.3	10	8.1	4	3.1	1	.4
Class VI	76	72	94.9	3	4.4	(2)	.4	(2)	.3
Other farms	302	294	97.4	6	2.0	2	.6	(2)	(2)
Type of farm:									
Cash-grain farms	26	13	52.5	6	25.3	3	12.9	2	9.3
Cotton farms	1	1	100.0						
Other field-crop farms	125	113	90.3	7	5.7	4	3.2	1	.8
Vegetable farms	7	7	94.1	(2)	4.0	(2)	.3	(2)	1.6
Fruit-and-nut farms	11	10	91.5	1	4.8	(2)	3.7		
Dairy farms	146	78	53.6	40	27.4	19	13.0	9	6.0
Poultry farms	49	43	87.6	4	9.0	1	2.6	(2)	.7
Livestock farms other than dairy and poultry	58	41	70.7	11	18.7	4	7.2	2	3.4
General farms	42	27	64.5	8	18.2	5	12.5	2	4.8
Primarily crop	9	7	71.7	2	17.6	1	7.9	(2)	2.8
Primarily livestock	7	4	59.5	2	22.3	1	15.2	(2)	3.0
Crop and livestock	26	16	63.1	4	17.3	3	13.5	2	6.1
Miscellaneous and unclassified farms	313	304	97.1	7	2.1	2	.7	(2)	.1
Southern area, total	1,476	1,377	93.2	68	4.6	26	1.7	7	.4
Economic class of farm:									
Commercial farms	918	826	90.0	61	6.6	25	2.8	6	.7
Class I	17	8	45.1	5	29.3	3	16.7	2	8.9
Class II	39	22	56.0	9	22.8	7	16.7	2	4.6
Class III	99	78	78.0	14	13.6	7	7.1	1	1.3
Class IV	228	207	90.8	16	7.1	4	1.9	1	.3
Class V	313	297	94.9	12	3.7	4	1.1	1	.2
Class VI	222	215	96.9	5	2.4	1	.5	(2)	.1
Other farms	558	551	98.6	7	1.2	(2)	(2)	(2)	.1
Type of farm:									
Cash-grain farms	26	14	52.6	8	31.0	4	14.3	1	2.1
Cotton farms	413	392	95.0	14	3.3	6	1.3	1	.3
Other field-crop farms	222	210	94.5	10	4.3	3	1.1	(2)	.1
Vegetable farms	8	8	97.7	(2)	1.5	(2)	.3	(2)	.5
Fruit-and-nut farms	16	16	97.4	(2)	1.7			(2)	.9
Dairy farms	47	36	76.8	6	13.1	4	7.9	1	2.1
Poultry farms	35	32	92.0	2	6.0	1	1.7	(2)	.3
Livestock farms other than dairy and poultry	77	60	77.7	11	14.0	5	6.6	1	1.8
General farms	61	47	77.0	9	14.9	4	6.0	1	2.2
Primarily crop	29	23	77.5	4	14.9	2	5.1	1	2.5
Primarily livestock	3	2	72.3	1	16.9	(2)	6.8	(2)	4.1
Crop and livestock	29	22	77.0	4	14.6	2	6.7	1	1.7
Miscellaneous and unclassified farms	571	562	98.4	8	1.4	1	.1	(2)	.1

See footnotes at end of table.

Table 29.—NUMBER OF FARMS, AND NUMBER OF FARMS REPORTING 1, 2, OR 3 KINDS [1] OF FIELD MACHINES, BY ECONOMIC CLASS OF FARM, AND BY TYPE OF FARM, FOR THE UNITED STATES AND AREAS: 1954—Con.

[Data are estimates based upon reports for only a sample of farms. See text]

Item	Number of all farms (000)	Farms reporting, by number of 3 kinds of field machines							
		None		1		2		3	
		Number (000)	Percent of all farms	Number (000)	Percent of all farms	Number (000)	Percent of all farms	Number (000)	Percent of all farms
Central area, total	1,366	716	52.4	262	19.2	277	20.2	111	8.1
Economic class of farm:									
Commercial farms	1,090	458	42.0	248	22.8	273	25.1	110	10.1
Class I	37	5	14.0	6	14.9	15	41.0	11	30.1
Class II	193	19	9.9	38	19.5	89	46.4	47	24.3
Class III	316	82	26.0	93	29.4	106	33.4	35	11.2
Class IV	273	140	51.2	74	27.2	46	16.8	13	4.8
Class V	188	138	73.5	31	16.7	15	8.0	3	1.7
Class VI	84	74	88.5	7	8.0	2	2.6	1	.8
Other farms	276	258	93.6	14	5.0	3	1.1	1	.3
Type of farm:									
Cash-grain farms	269	72	26.9	65	24.1	103	38.1	29	10.9
Cotton farms	12	9	73.8	2	19.9	1	5.3	(*)	1.0
Other field-crop farms	8	6	70.7	2	18.6	1	7.7	(*)	3.0
Vegetable farms	8	7	89.1	1	6.6	(*)	4.0	(*)	.3
Fruit-and-nut farms	7	6	86.3	1	9.7	(*)	2.7	(*)	1.3
Dairy farms	288	165	57.4	64	22.4	37	13.0	21	7.2
Poultry farms	38	29	76.9	5	12.3	3	6.8	2	4.0
Livestock farms other than dairy and poultry	316	108	34.3	74	23.5	92	29.1	41	13.0
General farms	139	50	35.9	35	25.0	37	26.8	17	12.3
Primarily crop	10	4	44.7	3	32.6	2	18.2	(*)	4.5
Primarily livestock	43	19	44.4	10	24.0	9	20.2	5	11.4
Crop and livestock	87	27	30.8	21	24.6	27	31.0	12	13.6
Miscellaneous and unclassified farms	282	264	93.6	14	5.0	3	1.0	1	.3
Great Plains area, total	761	451	59.2	191	25.2	96	12.6	23	3.0
Economic class of farm:									
Commercial farms	574	271	47.3	185	32.2	95	16.6	23	3.9
Class I	26	9	34.8	11	40.9	4	15.8	2	8.5
Class II	86	23	27.0	34	39.3	22	25.4	7	8.3
Class III	149	45	30.1	57	38.3	38	25.6	9	5.9
Class IV	148	68	45.9	53	35.9	23	15.8	4	2.4
Class V	105	74	70.2	24	22.9	7	6.3	1	.6
Class VI	60	53	87.6	6	10.2	1	1.8	(*)	.3
Other farms	187	179	95.8	7	3.5	1	.5	(*)	.1
Type of farm:									
Cash-grain farms	182	46	25.1	87	48.0	41	22.5	8	4.3
Cotton farms	91	72	78.7	18	19.4	2	1.8	(*)	.1
Other field-crop farms	6	4	60.5	2	34.3	(*)	5.2	----	----
Vegetable farms	3	3	96.5	(*)	3.5	----	----	----	----
Fruit-and-nut farms	1	1	100.0	----	----	----	----	----	----
Dairy farms	31	18	59.7	8	24.7	4	11.8	1	3.8
Poultry farms	13	12	87.3	1	9.0	1	3.8	----	----
Livestock farms other than dairy and poultry	177	89	50.1	47	26.3	32	18.3	9	5.2
General farms	68	26	38.1	22	32.7	16	23.0	4	6.2
Primarily crop	12	6	50.7	4	31.9	2	14.2	(*)	3.2
Primarily livestock	10	4	40.2	3	33.8	2	20.0	1	6.0
Crop and livestock	45	16	34.2	15	32.7	12	26.1	3	7.0
Miscellaneous and unclassified farms	188	181	95.8	7	3.5	1	.5	(*)	.1
Western area, total	423	321	76.0	80	19.0	20	4.8	1	.2
Economic class of farm:									
Commercial farms	293	196	66.8	77	26.2	20	6.7	1	.3
Class I	38	21	53.8	14	35.8	4	9.7	(*)	.7
Class II	62	34	55.0	21	33.8	7	10.8	(*)	.3
Class III	67	42	63.8	19	28.2	5	7.6	(*)	.4
Class IV	63	46	73.1	14	22.5	3	4.0	(*)	.4
Class V	46	38	81.6	7	15.6	1	2.8	----	----
Class VI	17	15	88.1	2	11.1	(*)	.8	----	----
Other farms	130	126	96.7	3	2.7	1	.6	(*)	(*)
Type of farm:									
Cash-grain farms	45	12	25.7	28	60.6	6	13.2	(*)	.6
Cotton farms	11	8	70.9	3	25.4	(*)	3.5	(*)	.2
Other field-crop farms	11	7	59.6	3	30.4	1	9.5	(*)	.5
Vegetable farms	7	6	86.8	1	12.9	(*)	.3	----	----
Fruit-and-nut farms	50	48	96.7	2	3.2	(*)	.1	----	----
Dairy farms	43	30	71.3	10	24.4	2	4.1	(*)	.2
Poultry farms	22	20	93.0	1	5.6	(*)	1.4	----	----
Livestock farms other than dairy and poultry	66	43	65.2	17	25.7	6	8.5	(*)	.5
General farms	32	16	50.3	11	35.5	4	13.7	(*)	.5
Primarily crop	17	8	48.3	6	36.8	2	13.9	(*)	.9
Primarily livestock	2	1	53.7	1	32.5	(*)	13.8	----	----
Crop and livestock	12	6	52.2	4	34.4	2	13.4	----	----
Miscellaneous and unclassified farms	137	132	96.3	4	3.1	1	.6	(*)	(*)

* Quantity less than half of the smallest unit: less than 500 or less than 0.05 percent.

[1] The 3 machines included are grain combines, corn pickers, and pick-up hay balers.

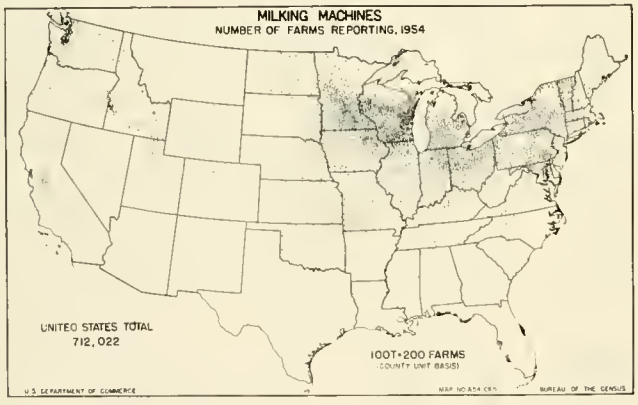
CHORE EQUIPMENT

Human labor is the oldest form of power in agriculture. Even after a hundred years of the development of labor-saving machines and practices, much farmwork remains to be done by hand or with small hand tools. A large part of this handwork is used for feeding and caring for livestock, although even in this field of work several important labor-saving machines and practices have been put into effect on many farms. The extension of central station electric service to almost 95 percent of the farms has made possible the use of many kinds of electrical equipment in service buildings and service areas. Many of these pieces of equipment, such as tool grinders, portable drills, and circular saws, require little electric power for operation. Other items, such as crop driers, may require motors of 7.5 and even 10 horsepower. The livestock chore equipment discussed here is limited to only three items, namely, milking machines, power feed grinders, and electric pig brooders. These are the items of chore equipment reported for the 1954 Census of Agriculture.

MILKING MACHINES

Dairy farmers generally have accepted the milking machine as a necessary item in the barn or milking parlor. The number of farms with milking machines almost doubled between 1945 and 1954, increasing from 365,000 to 712,000. Most of this increase came between 1945 and 1950, a period when electric distribution lines were being extended rapidly in rural areas and when many farming areas were experiencing labor shortages.

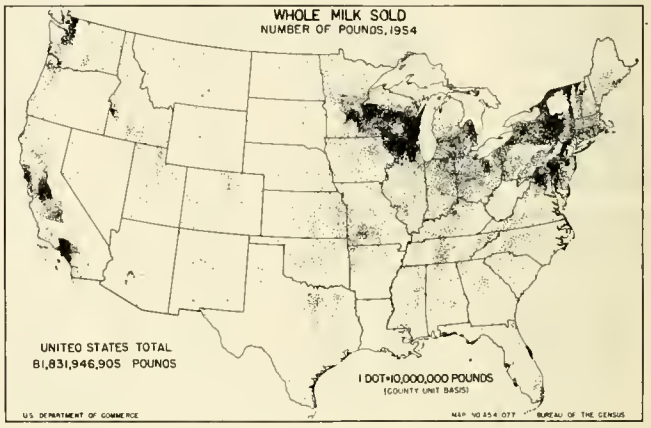
The number of farms reporting milking machines in the southern area, where dairying is expanding, increased from 6,000 in 1945 to almost 35,000 in 1954. Although the number of milking machines in the Southern States still is small, the rapid increase does indicate considerable progress in dairying in this part of the country.

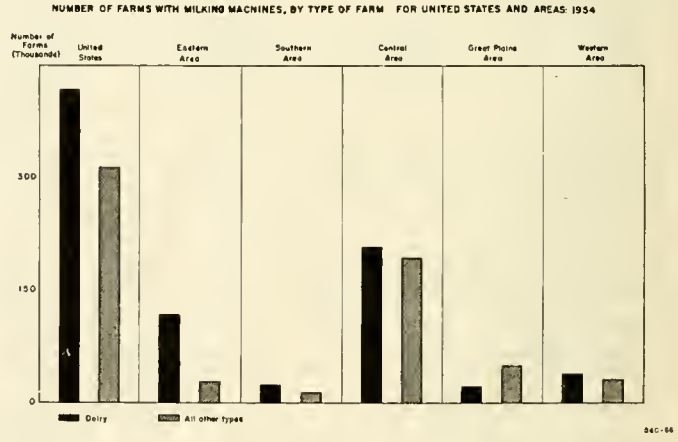


Milking machines are concentrated in the areas that produce whole milk for sale. Farms of the central and eastern areas produced three-fourths of the milk sold by farmers in 1954 and had three-fourths of the milking machines reported.

Wisconsin, the leading dairy State, with 2.2 million milk cows and more than 14 billion pounds of milk sold in 1954, had 100,761 farms with milking machines. Minnesota with 74,000 farms with milking machines and New York with 51,000 followed in order of number of farms reporting. Dairy farms in California frequently have large herds of 100 or more cows. Farmers in California sold about 8 percent of the whole milk sold in 1954 and had only 2 percent of the farms with milking machines.

Several types of farms other than dairy farms have milk cows varying in number from only a few head to sizable herds. Consequently, milking machines are used by many farmers who are not classified as dairy farmers. Of the 712,000 farms reporting milking machines in 1954, more than 300,000 or 44 percent were classified as other than dairy farms. Livestock farms other than dairy and poultry farms accounted for 13 percent of all farms with milking machines, and general farms, many of which have milk cows, accounted for another 13 percent. Dairy farms, and other types with milking machines are especially numerous in the central area. In the Great Plains area dairy farms having milking machines are only half as numerous as other types of farms which reported milking machines.





Milking machines are now generally used throughout the country on farms with 10 or more milk cows. Seventy percent of the commercial farms with 10 to 19 milk cows in 1954 reported a milking machine while 90 percent of the farms with 20 or more milk cows reported a milking machine. In recent years many farms with small herds of milk cows have turned to machine milking. Estimates made by the United States Department of Agriculture show that only 7 percent of the milking machines on January 1, 1943, were on farms where less than 9 cows were milked. In November 1954 according to the Census, almost one-fourth of all commercial farms reporting milking machines had 1 to 9 milk cows. About a fourth of these were farms having less than five milk cows. Most of the older milking machines on farms are of the two-unit type. The operator carries the milk to the milk room and pours it into a milk can. Recently, however, dairy installations of pipeline milkers and bulk coolers have been increasing rapidly. By this method the milk is handled entirely by mechanical means. It is another step in the mechanization of farm chore operations and has reduced the time used to milk a cow and has made the work much easier.

Table 30.—FARMS REPORTING MILK COWS, AND FARMS REPORTING MILKING MACHINES, BY NUMBER OF MILK COWS, FOR ALL COMMERCIAL FARMS AND DAIRY FARMS, FOR THE UNITED STATES AND AREAS: 1954

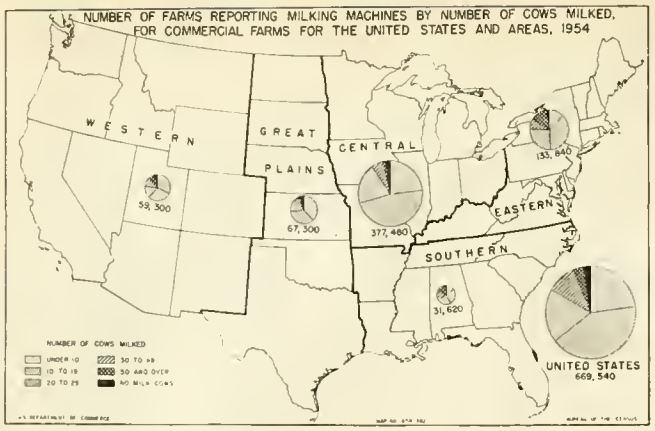
[Data are estimates based upon reports for only a sample of farms. See text]

Item	United States	Area				
		Eastern	Southern	Central	Great Plains	Western
Number of farms reporting milk cows by number of cows:						
All commercial farms—farms (000)	2,141	336	497	785	371	151
1 to 4 cows—do	1,066	143	384	247	210	81
5 to 9 cows—do	432	56	62	197	91	25
10 to 19 cows—do	404	67	30	233	50	23
20 to 29 cows—do	151	38	10	81	12	9
30 to 49 cows—do	62	23	6	22	4	7
50 or more cows—do	26	8	5	4	2	6
Dairy farms—do	537	138	47	280	30	41
1 to 4 cows—do	25	5	4	11	2	3
5 to 9 cows—do	96	18	9	55	6	7
10 to 19 cows—do	219	51	15	131	9	13
20 to 29 cows—do	118	35	9	60	7	7
30 to 49 cows—do	57	22	6	19	3	6
50 or more cows—do	22	8	4	3	2	5
Percent of farms reporting milking machines for farms classified by number of milk cows:						
All commercial farms—percent	31.3	39.8	6.4	48.1	18.2	39.2
1 to 4 cows—do	3.8	2.9	.4	7.6	3.9	9.2
5 to 9 cows—do	26.1	22.0	4.5	34.7	19.1	45.3
10 to 19 cows—do	69.8	73.7	30.0	77.1	47.6	77.5
20 to 29 cows—do	90.2	92.1	74.0	93.1	75.2	94.9
30 to 49 cows—do	95.4	97.3	92.1	95.0	88.9	97.1
50 or more cows—do	88.0	95.5	77.6	95.9	81.1	83.7
Dairy farms—do	73.2	80.6	52.0	73.4	60.4	80.7
1 to 4 cows—do	17.1	12.8	7.1	19.3	9.5	36.8
5 to 9 cows—do	35.3	44.6	8.7	35.3	17.4	62.6
10 to 19 cows—do	77.7	81.3	48.4	80.6	64.1	78.2
20 to 29 cows—do	92.0	92.8	78.7	94.1	88.4	91.4
30 to 49 cows—do	96.2	97.7	92.6	95.3	91.3	100.0
50 or more cows—do	94.1	95.4	93.1	95.6	85.2	94.5

Table 31.—NUMBER OF FARMS, AND PERCENT OF FARMS REPORTING MILKING MACHINES, BY TYPE OF FARM, FOR THE UNITED STATES AND AREAS: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

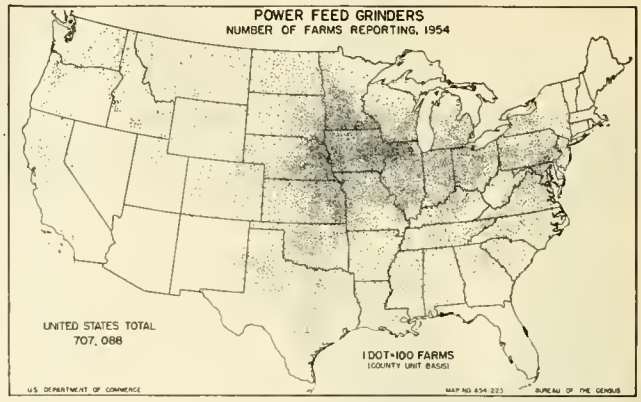
Item and type of farm	United States	Area					Item and type of farm	United States	Area				
		Eastern	Southern	Central	Great Plains	Western			Eastern	Southern	Central	Great Plains	Western
	Number (000)							Percent					
Number of farms, total	4,806	779	1,477	1,366	761	423	Percent of all farms reporting by type of farm:						
Type of farm:							Cash-grain farms	13.8	8.0	1.1	17.8	11.7	9.1
Cash-grain farms	547	26	26	269	182	45	Cotton farms	.8		.5	.6	1.2	8.3
Cotton farms	528	1	413	12	91	11	Other field-crop farms	2.3	3.0	.5	12.7	2.2	22.0
Other field-crop farms	373	125	222	8	6	11	Vegetable farms	3.2	4.2	.5	4.6	.8	4.8
Vegetable farms	33	7	8	8	3	7	Fruit-and-nut farms	2.8	6.0	.7	7.4	1.0	2.1
Fruit-and-nut farms	86	11	16	7	1	50	Dairy farms	72.4	79.9	49.7	71.1	63.9	86.8
Dairy farms	554	146	47	288	31	43	Poultry farms	5.9	6.2	2.8	9.0	3.9	5.9
Poultry farms	157	49	35	38	13	22	Livestock farms other than dairy and poultry	13.1	5.7	2.1	20.9	7.9	9.7
Livestock farms other than dairy and poultry	694	58	77	316	177	66	General farms	26.9	19.9	3.4	43.6	18.1	27.0
General farms	342	42	61	139	68	32	Primarily crop	7.3	9.5	.8	15.2	4.2	14.7
Primarily crop	78	9	29	10	12	17	Primarily livestock	43.4	35.6	15.8	51.5	22.4	45.5
Primarily livestock	65	7	3	43	10	2	Crop and livestock	29.2	19.6	4.7	42.9	21.0	40.3
Crop and livestock	199	26	29	87	45	12	Miscellaneous and unclassified farms	1.8	2.2	.5	3.4	1.1	4.1
Miscellaneous and unclassified farms	1,491	313	571	282	188	137							



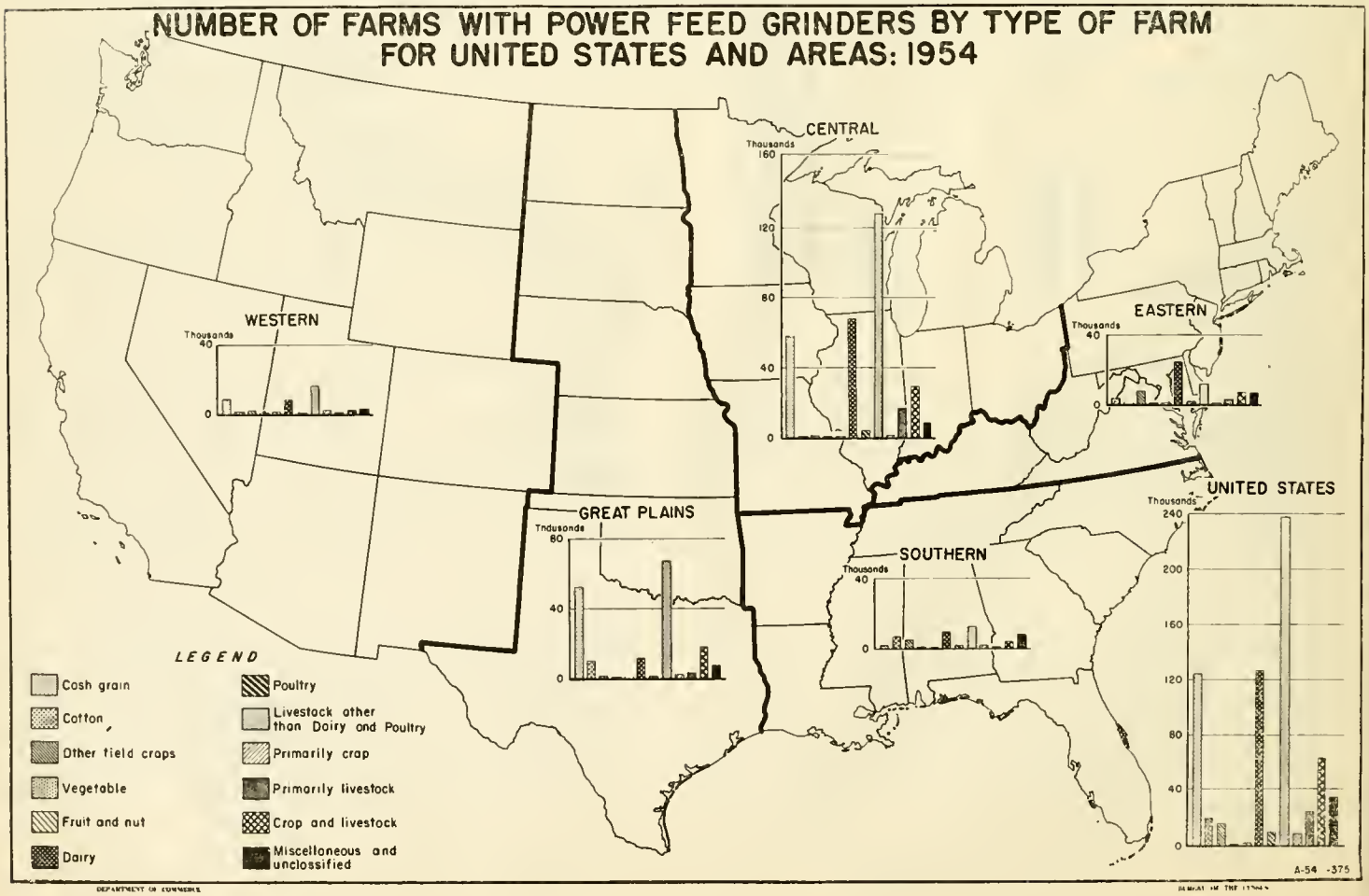
POWER FEED GRINDERS

For many years, some farmers have made a practice of grinding home-grown grains and grains bought from local farmers, for their livestock; others have followed the practice of hauling their grain to commercial grinding mills. Recent technological developments in power grinders and in power units have encouraged more grinding on the farm. Most of the grinders used today are powered by a farm tractor or an electric motor. Many of the electric powered grinders are relatively small and have automatic controls.

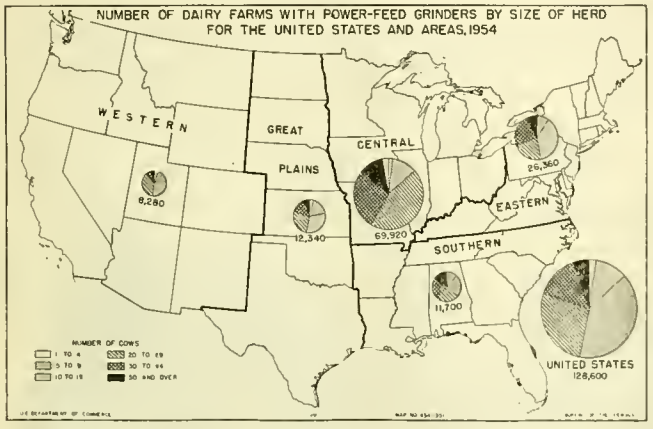
Power feed grinders on farms are concentrated in the grain-livestock farming areas. Almost half of the farms reporting feed grinders in 1954 were in the 8 States which comprise the Corn Belt and Lake States. About one-ninth of them were in Iowa alone. Another one-fourth were in the 6 Great Plains States, and the remaining one-fourth were scattered over the remaining 34 States.



More than one-third of the livestock farms, other than dairy or poultry farms, reported power feed grinders in 1954. These farms were most numerous in the Central and Great Plains areas where livestock raising and feeding is important. Dairy, cash-grain, and general crop and livestock farms were the other farm types most frequently reporting power feed grinders. A large proportion of these are located in the Central grain and livestock area. Few poultry farmers used this kind of equipment, primarily because nutritional requirements for poultry production are so exacting that few farmers decide to grind and mix their poultry feed. Dairy farmers also face the same problem as poultry farmers but to a lesser degree.



Power feed grinders were reported on dairy farms regardless of size of herd in 1954, even on many farms with less than 10 cows. Power feed grinders on small dairy farms that grow their own feed is a means of preparing grain for feeding without the time and expense of making numerous trips to the grinding mill. In all areas, except the Southern, a large proportion of the dairy farms with power feed grinders had from 10 to 19 cows, and another large proportion in all regions had from 20 to 29 cows. Dairy farms with herds in these two size groups represented two-thirds of all dairy farms reporting feed grinders in 1954. The cost of feed often represents a substantial part of the cash cost of operating a dairy farm. In the Northeastern region, for example, expenditures for feed on a typical family sized dairy farm probably represents a third of the total cash cost of operating the farm. In the central corn and livestock areas, expenditures for dairy feed usually represent a smaller proportion of total cash costs. In 1954, the average expenditure for feed by dairy farmers with 20 to 29 milk cows ranged from about $2,500 in the eastern area to $1,400 in the central region. Much of the feed fed to cows in the Eastern area was produced in the Central area. Many of the large dairy farms in California buy all of their concentrated feed. Dairy farms in the Western region with 50 cows or more spent an average of $16,000 for feed in 1954. It should be pointed out that all of the feed bought by dairy farmers in 1954 was not necessarily for milk cows. Some of it may have been fed to hogs, poultry, or other livestock.



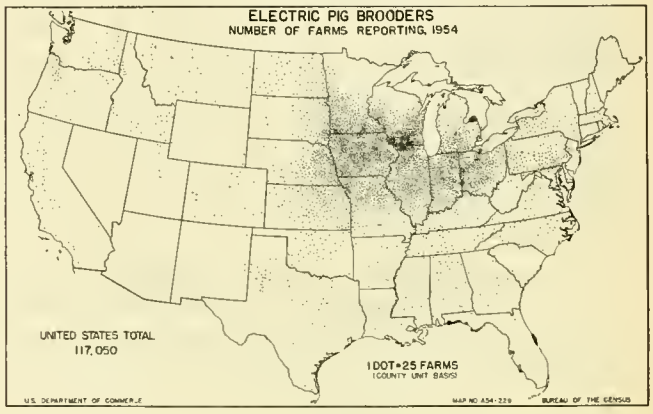
ELECTRIC PIG BROODERS

Traditionally, heavy farrowing in April and May have resulted in heavy marketings and seasonally low hog prices in late fall and early winter months. In order to have their hogs ready for an earlier market, many farmers have pushed the farrowing dates ahead to the cold, damp months of late winter and early spring. Providing heat for the new-born pigs then became a problem.

Years ago most artificial heat for this purpose was provided by coal, wood, or oil burning stoves, bricks heated on the kitchen range and other methods, none of which were entirely satisfactory. During bad weather it was not uncommon for the kitchen to be converted into a pig nursery. As electric service became available, many farmers adopted the electric pig brooder. This equipment requires little attention and is relatively free from fire hazard.

During the winter months the electric pig brooder is in operation for an individual litter of pigs for a week or 10 days. Sometimes it is the only source of artificial heat provided but often it is used in conjunction with other sources of heat, especially in central farrowing houses. It is seldom used during the summer months.

In November 1954, approximately 117,000 farmers reported electric pig brooders. These farmers were scattered throughout the hog-producing areas of the country, even in some areas of the South. Two-thirds of them were in the important hog producing Corn Belt and Lake States. Iowa and Illinois alone had a fifth of all the farms reporting electric pig brooders in 1954. Farms with electric pig brooders were also numerous along the eastern border of the Northern Plains where corn and hog production are important farming enterprises.



Somewhat more than 1 million farms reported sows farrowing between December 1, 1953, and June 1, 1954. More than three-fourths of these had fewer than 10 sows farrowing. About one-third reported between 5 and 14 sows farrowing in the 6-month period. Less than 7 percent of all farms reporting sows farrowing during this period had 20 or more sows. A close relationship exists between numbers of farms reporting different numbers of sows farrowing and number of farms reporting number of electric pig brooders. More than half of the farms reporting electric pig brooders had 1 to 9 sows farrowing, and many of these had only 1 or 2 sows farrowing. The electric pig brooder is a fairly inexpensive device for saving pigs at farrowing time. It is an important device for the small hog producer as well as for the large commercial producer, neither of whom can afford high pig losses.

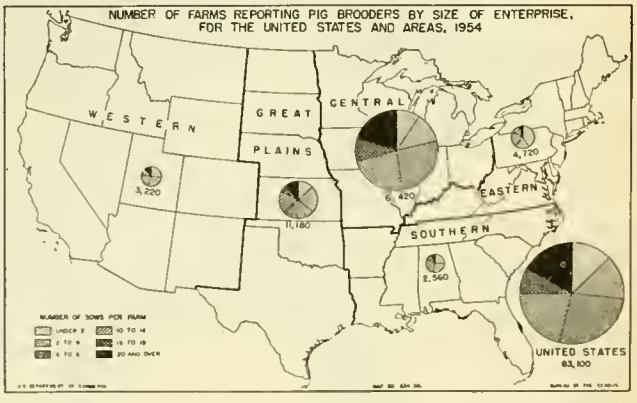


Table 32.—NUMBER OF FARMS, AND PERCENT OF FARMS REPORTING POWER FEED GRINDERS, BY TYPE OF FARM, FOR THE UNITED STATES AND AREAS: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Item and type of farm	United States	Area				
		Eastern	Southern	Central	Great Plains	Western
	Number (000)					
Number of farms, total	4,806	779	1,477	1,366	761	423
Type of farm:						
Casb-grain farms	547	26	26	269	182	45
Cotton farms	528	1	413	12	91	11
Other field-crop farms	373	125	222	8	6	11
Vegetable farms	33	7	8	8	3	7
Fruit-and-nut farms	86	11	16	7	1	50
Dairy farms	554	146	47	288	31	43
Poultry farms	157	49	35	38	13	22
Livestock farms otber than dairy and poultry	694	58	77	316	177	66
General farms	342	42	61	139	68	32
Primarily crop	78	9	29	10	12	17
Primarily livestock	65	7	3	43	10	2
Crop and livestock	199	26	29	87	45	12
Miscellaneous and unclassified farms	1,491	313	571	282	188	137

Item and type of farm	United States	Area				
		Eastern	Southern	Central	Great Plains	Western
	Percent					
Percent of all farms reporting by type of farm:						
Cash-grain farms	22.8	12.5	10.1	21.6	29.1	17.8
Cotton farms	3.8	-------	1.7	2.6	12.5	9.7
Other field-crop farms	4.3	6.2	2.2	8.7	14.8	15.6
Vegetable farms	2.9	2.9	3.8	1.6	5.8	1.7
Fruit-and-nut farms	2.7	5.8	1.4	4.0	-------	2.3
Dairy farms	22.9	18.4	24.0	23.8	38.8	19.4
Poultry farms	6.1	4.9	4.1	10.8	8.0	2.3
Livestock farms other than dairy and poultry	34.3	23.0	16.0	40.6	38.4	24.7
General farms	28.3	24.4	9.9	35.4	36.7	19.4
Primarily crop	10.9	5.9	4.5	10.3	23.8	15.5
Primarily livestock	36.8	34.5	20.3	39.6	35.0	22.8
Crop and livestock	32.3	28.5	14.2	36.1	40.6	24.1
Miscellaneous and unclassified farms	2.3	2.2	1.4	3.1	4.0	2.0

Table 33.—NUMBER OF FARMS, EXPENDITURES FOR FEED, AND FARMS REPORTING FEED GRINDERS, FOR DAIRY FARMS, CLASSIFIED BY SIZE OF HERD, FOR THE UNITED STATES: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Size of herd	Dairy farms		Expenditures for feed for livestock and poultry		Farms reporting feed grinders	
	Number (000)	Percent distribution	Dollars (000)	Per farm reporting (dollars)	Number (000)	Percent of dairy farms
Total	537	100.0	873,409	1,684	129	24.0
1 to 4 milk cows	25	4.7	8,476	376	3	10.7
5 to 9 milk cows	96	17.9	49,050	561	14	15.0
10 to 19 milk cows	219	40.8	215,301	1,039	51	23.5
20 to 29 milk cows	118	21.9	218,929	1,923	35	29.4
30 to 49 milk cows	57	10.5	176,474	3,155	19	33.2
50 milk cows and over	22	4.1	205,178	9,455	7	29.5

Table 34.—FARMS REPORTING SOWS FARROWING BETWEEN DECEMBER 1, 1953, AND JUNE 1, 1954, AND FARMS REPORTING ELECTRIC PIG BROODERS, FOR THE UNITED STATES AND AREAS: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Item	United States	Area				
		Eastern	Southern	Central	Great Plains	Western
All farms—number (000)	4,806	779	1,477	1,366	761	423
Farms reporting sows farrowing between:						
Dec. 1, 1953, and June 1, 1954—farms (000)	1,004	92	221	515	150	25
percent of all farms	20.9	11.8	15.0	37.7	19.8	5.9
Percent distribution of farms reporting sows farrowing between Dec. 1, 1953, and June 1, 1954, by number of sows farrowing:						
1 sow—percent	22.4	37.6	47.5	10.1	16.6	34.7
2 sows—percent	16.1	23.0	23.0	11.6	16.8	20.6
3 sows—percent	10.1	11.0	11.4	9.1	10.3	13.1
4 sows—percent	7.8	7.3	5.6	8.7	8.6	8.0
5 to 9 sows—percent	21.1	14.8	9.4	26.1	25.7	15.6
10 to 14 sows—percent	11.1	3.3	1.9	16.3	12.7	3.7
15 to 19 sows—percent	4.7	1.2	.8	7.4	3.9	1.0
20 to 29 sows—percent	4.4	.9	.3	7.1	4.2	.9
30 sows and over—percent	2.3	.8	.2	3.8	1.2	2.4
Percent of farms reporting electric pig brooders, by number of sows farrowing between Dec. 1, 1953, and June 1, 1954:						
1 sow—percent	1.8	2.4	.2	4.4	1.8	4.6
2 sows—percent	3.8	5.2	.9	5.5	3.7	8.9
3 sows—percent	6.2	4.1	1.7	7.3	8.0	24.5
4 sows—percent	6.9	6.2	2.4	9.0	4.3	6.0
5 to 9 sows—percent	10.8	8.3	3.6	12.2	10.0	18.5
10 to 14 sows—percent	15.5	16.3	7.2	16.6	11.0	39.1
15 to 19 sows—percent	14.8	19.6	6.4	15.1	13.7	41.7
20 to 29 sows—percent	19.1	12.5	2.8	20.9	11.8	18.2
30 sows and over—percent	23.4	-------	4.3	24.4	24.5	36.7

SERVICE EQUIPMENT

Farms in some rural areas have had telephone service for a long time. Now electricity on the farm is supplying the heat and energy long lacking for really modernizing the farm home. Electric toasters, irons, radios, refrigerators, space heaters, and washing machines are commonplace pieces of electrical equipment in many farm homes. Television sets, home freezers, and running water in the home are becoming more commonplace, although many farm homes still lack one or more of these items. The discussion in this section deals with four of these service items for which the Census obtains data. These items are telephones, television sets, home freezers, and piped running water.

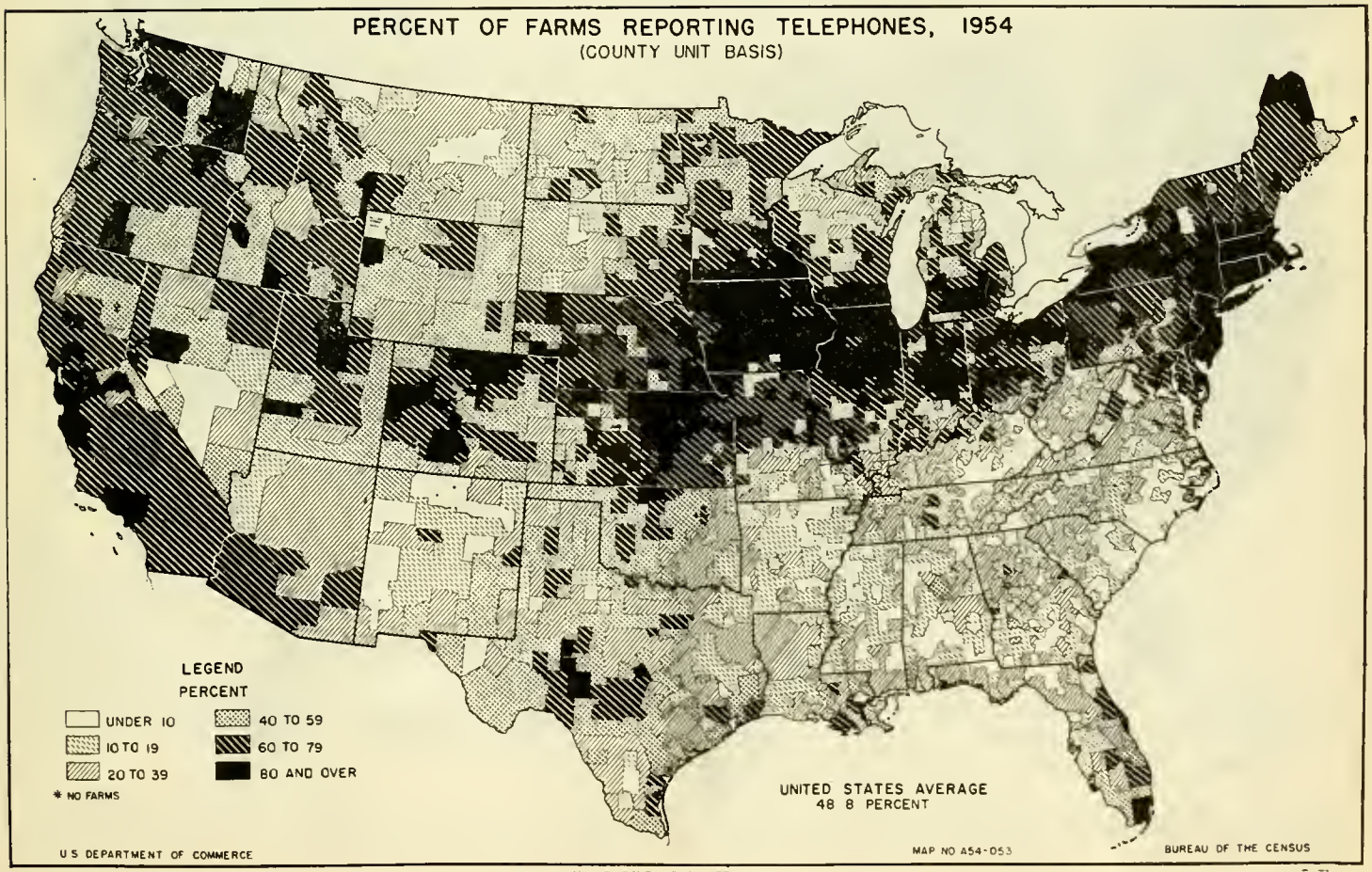
TELEPHONES

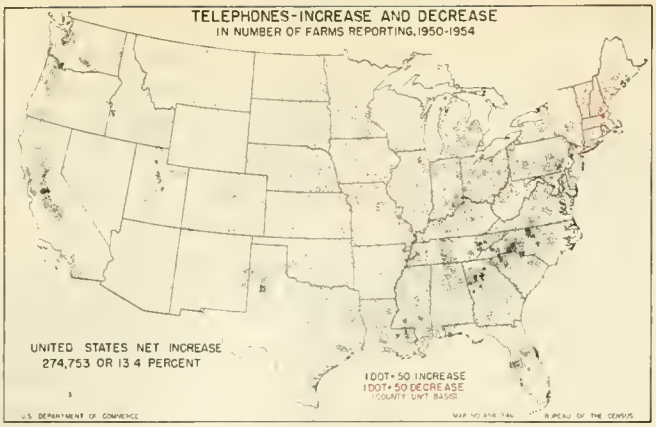
Of all our early technological developments, the telephone was one of the most rapidly accepted and widely distributed on farms. The telephone was invented in 1876 and by 1920 almost 40 per cent of all farms had a telephone. Many of the early telephone lines were inexpensively constructed with the wires strung on fence posts, trees, and small poles. Frequently a dozen or more farms were on one "party line." Exchange service often was unsatisfactory. By 1930, farms with telephones had decreased from the number in 1920 (2,498,000) by more than a third of a million, and by 1940 another decrease of more than a half million had taken place. The depression of the 1930's contributed to the latter decrease. Another important factor, however, was the prevalence of automobiles and hard-surfaced roads which gave the farmer more mobility and greatly reduced his isolation. The radio also helped keep him in contact with the central markets, the weather reports, and other developments.

With the increase in commercial farming and in farm incomes after 1940, the percentage of farms with telephone service increased. By 1945, 32 percent of the farms had telephone service, and by 1950 about 38 percent had the service. In 1949 the Rural Electrification Administration was authorized by Congress to make loans to expand and improve telephone service in rural areas. By 1954 almost half of the farms had telephones.

The Northeastern area, with 77 percent of the farms reporting telephones in November 1954, topped all other farming regions in the proportion of farms with individual phone service. The Pacific area was close behind with 75 percent, and the Corn Belt was next with 71 percent of the farmers reporting telephones. In the Delta States, 17 percent of the farmers had telephones and in the Southeast, 20 percent. Iowa, with 168,000 farms reporting telephones, had more farms with telephones than any other State.

The number of farmers with telephone service increased from 1950 to 1954 by almost 13 percent. All 10 areas of the country shared in this increase. The Appalachian area with an increase of 54,000 farms reporting telephones, and the southeastern area with an increase of 49,000 farms reporting telephones lead other areas in the increase. For the Southeastern area, however, the increase amounted to 84 percent compared to an increase of 32 percent in the Appalachian area. Although more farms in all regions had telephones in 1954 than in 1950, some counties, especially in the New England States, had fewer farms with telephones at the end of the 5-year period. A large part of this decrease resulted from decrease in total number of farms rather than from the discontinuation of telephone service.



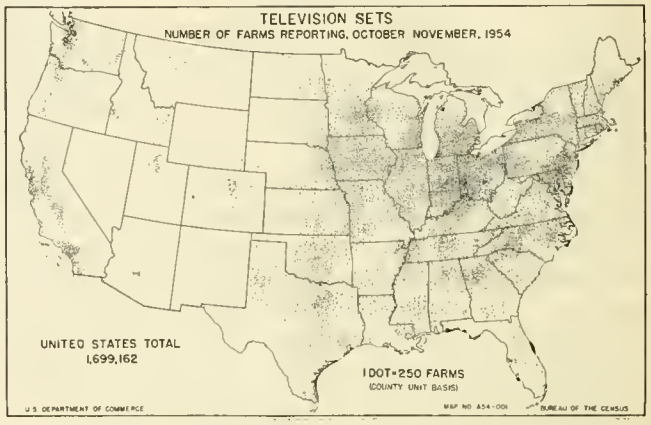


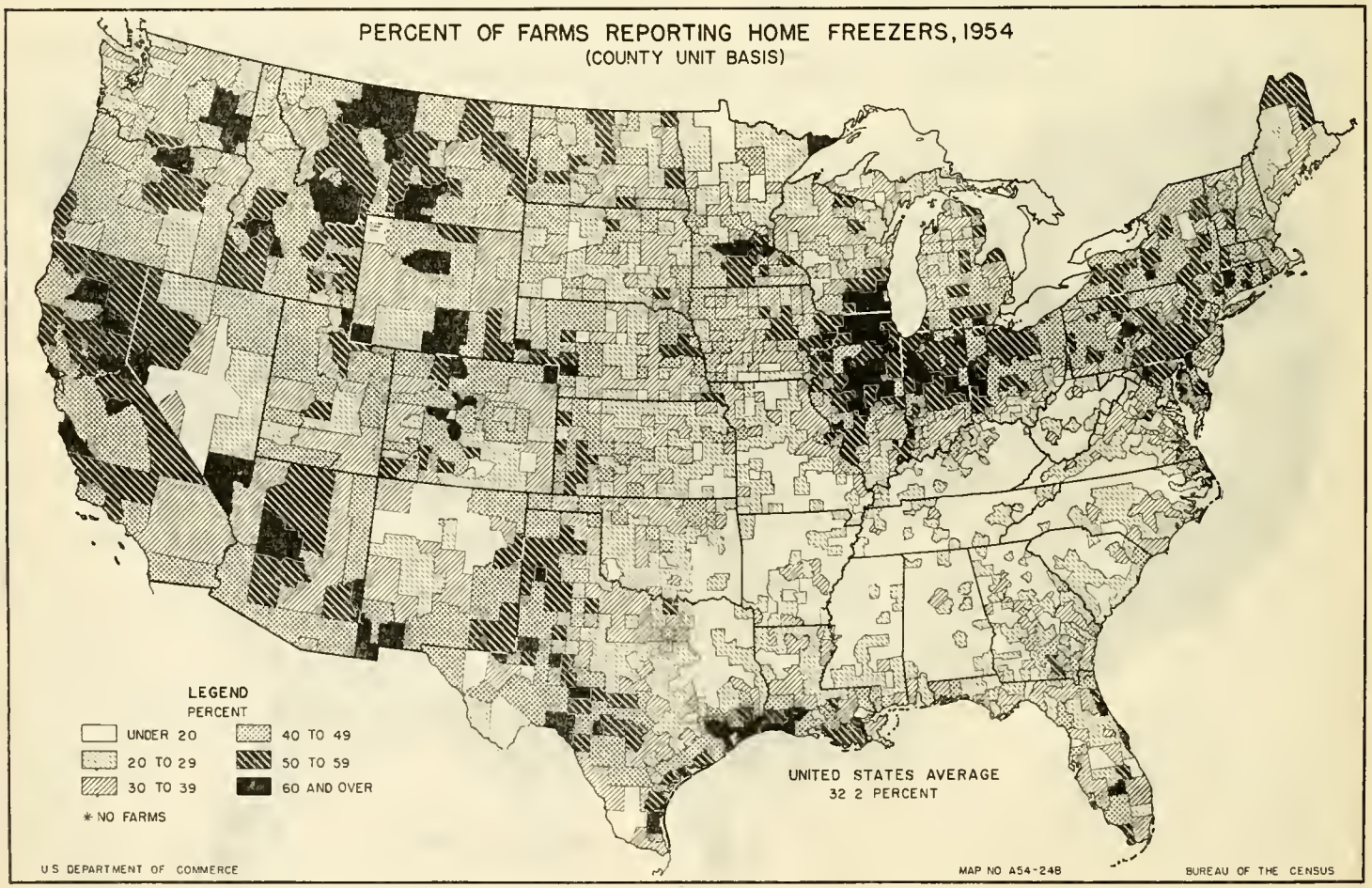
Frequency of reporting of telephones is closely related to size of farm business, or to economic class of farm. In 1954, for example, 22 percent of the farms in Economic Class VI had telephones, while 80 percent or more of the farms in Economic Classes I and II reported telephones. Among the tenure groups, almost 70 percent of share-cash tenants had telephones, as compared with 68 percent of managers, 57 percent of part owners, and 51 percent of full owners. Many of the owner-operated farms are small in size and have relatively low farm incomes. Farms of share tenants and croppers as a group had fewer telephones than farms in other economic classes.

TELEVISION SETS

The most recent development in mass communication is television. Farmers are rapidly installing television sets as reception becomes available to them. In November 1954, about 1.7 million farms, or more than 35 percent of all farms, had television sets. This number exceeds the number of farms reporting home freezers in 1954, by 10 percent.

The range for satisfactory reception of television broadcasts is definitely limited. For this reason, many farmers cannot use reception sets until broadcast facilities become available to their area. The percentage of farms reporting television sets in 1954 varied in the different areas from 60 percent in the northeastern area to less than 20 percent in the Delta area.





HOME FREEZERS

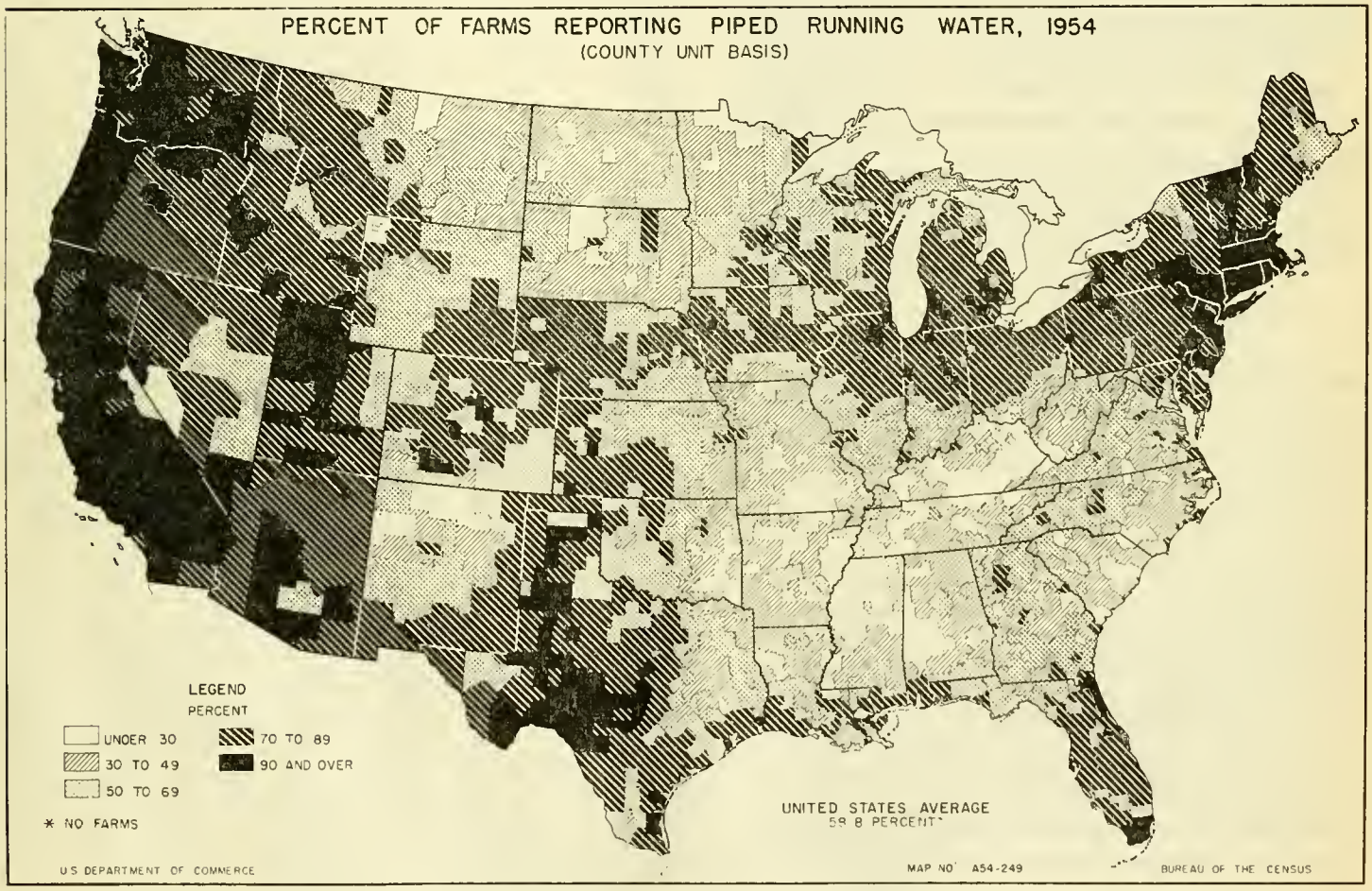
Farm homemaking has been revolutionized by modern refrigeration. In a great many cases the mechanical refrigerator was one of the first major pieces of electrical equipment bought after electric service was received at the farm. Many dairy farmers immediately after receiving electric service replaced the old water bath or ice type of refrigeration with an electric cooler. In fact, the old icehouse has about disappeared from farms. More recently the home freezer is providing a much-needed cold storage space on many farms. It will freeze and preserve many kinds of foods for protracted periods, usually ranging from a few days to a year. Home freezing has reduced the amount of canning done on many farms. The farm freezer often supplements or surplants the cold storage locker in a local plant.

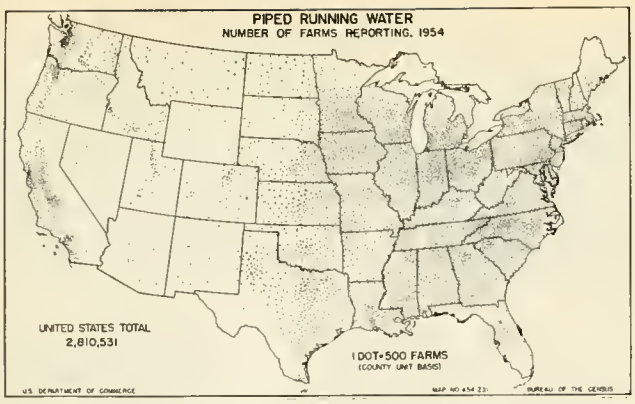
In 1950, about 651,000 farms reported home freezers. By 1954 the number had increased to 1,542,000, an increase of 137 percent. In the Northeast, Corn Belt, Lake States, Mountain, and Pacific States more than 40 percent of the farmers reported home freezers in 1954. In the Appalachian, Southeast, and Delta areas, about 20 percent of the farmers had home freezers. However, home freezers have been installed very rapidly on farms in these regions; there were almost 3 times as many farms with them in 1954 as in 1950.

PIPED RUNNING WATER

By most definitions a "modern home," whether in the city or on a farm must have electric service, central heat, and piped running water. A few farms had running water before they had electric service, often from a spring or reservoir located above the farmstead. On most farms, however, running water was only a dream until electric power made it practicable to install automatic pumps and pressure tanks. In 1954, more than 2.81 million farms had piped running water. This is about 59 percent of all farms and 478,000 more than the number of farms with telephone service.

The proportion of farms in all areas of the country having this facility ranged from 94 percent of all farms in the Pacific States, and 85 percent in the Northeast area to 36 percent in the Delta area. Piped running water on an individual farm may be used for household purposes, for farm purposes, or for both. On most farms, running water is first installed in the home and later it is extended to the service buildings and service areas. On many farms, however, the order of installation is reversed. The term "piped running water" on some farms means complete plumbing facilities with automatic water heaters, bathroom, and sewage disposal system. On other farms it may mean little more than water in the kitchen. Running water in service buildings is now almost a necessity for the operation of commercial dairy and poultry farms.





A direct relationship exists between level of farm incomes and the use of piped running water. More than 93 percent of Economic Class I farms but only 33 percent of the Class VI farms reported piped running water in 1954. Among the tenure groups, 64 percent of the full-owner operated farms, 68 percent of the part-owner operated farms, and 40 percent of the tenant-operated farms had piped running water.

COMBINATIONS OF SERVICE EQUIPMENT

Of the 4.8 million farms in November 1954, 1.9 million, or almost 40 percent had electricity, telephone, and piped running water. Prevalence of farms having all three of these items ranged from a high of 65 percent in the Western area to 17 percent in the Southern area. Electricity apparently was first installed by most farmers, as more than 25 percent of the farms had electricity, but neither telephone nor piped running water. Less than 1 percent of the farmers reported having a telephone only or running water only.

Table 35.—NUMBER AND PERCENT OF FARMS REPORTING ELECTRICITY, TELEPHONES, AND PIPED RUNNING WATER, FOR THE UNITED STATES AND AREAS: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Item	United States	Area				
		Eastern	Southern	Central	Great Plains	Western
All farms—number (000)	4,806	779	1,477	1,366	761	423
Farms reporting:						
Electricity, telephone, and piped running water—farms (000)	1,900	351	247	726	302	275
percent of all farms	39.5	45.1	16.7	53.1	39.7	65.0
Electricity, telephone, and no piped running water—farms (000)	386	52	44	198	81	10
percent of all farms	8.0	6.7	3.0	14.5	10.6	2.4
Electricity, no telephone, and piped running water—farms (000)	898	121	366	166	158	87
percent of all farms	18.7	15.6	24.8	12.2	20.7	20.5
Electricity, no telephone, and no piped running water—farms (000)	1,224	196	658	196	149	26
percent of all farms	25.5	25.1	44.5	14.4	19.6	6.1
No electricity, telephone, and piped running water—farms (000)	4	1	1	1	1	1
percent of all farms	.1	.1	(*)	.1	.1	.2
No electricity, no telephone, and piped running water—farms (000)	18	3	4	4	4	3
percent of all farms	.4	.4	.3	.3	.5	.8
No electricity, telephone, and no piped running water—farms (000)	17	3	1	8	4	1
percent of all farms	.4	.4	.1	.6	.5	.2
No electricity, no telephone, and no piped running water—farms (000)	359	52	156	67	63	21
percent of all farms	7.5	6.7	10.6	4.9	8.2	4.9

* Less than 0.1 of 1 percent.

Table 36.—NUMBER AND PERCENT OF FARMS REPORTING ELECTRICITY, TELEPHONES, AND PIPED RUNNING WATER, BY ECONOMIC CLASS OF FARM, FOR THE UNITED STATES: 1954

[Data are estimates based upon reports for only a sample of farms. See text]

Item	All farms	Commercial farms						Other farms
		Class I	Class II	Class III	Class IV	Class V	Class VI	
All farms—number (000)	4,806	136	443	726	821	769	458	1,453
Farms reporting:								
Electricity, telephone, and piped running water—farms (000)	1,900	111	324	411	306	204	69	476
percent of all farms	39.5	81.6	73.3	56.6	37.2	26.5	15.1	32.7
Electricity, telephone, and no piped running water—farms (000)	386	2	27	76	87	65	30	98
percent of all farms	8.0	1.8	6.2	10.5	10.6	8.5	6.7	6.7
Electricity, no telephone, and piped running water—farms (000)	898	16	63	128	167	146	81	298
percent of all farms	18.7	11.4	14.1	17.6	20.4	19.0	17.6	20.5
Electricity, no telephone, and no piped running water—farms (000)	1,224	2	17	82	206	278	200	440
percent of all farms	25.5	1.5	3.8	11.3	25.1	36.1	43.8	30.3
No electricity, telephone, and piped running water—farms (000)	4	(*)	(*)	1	1	(*)	(*)	2
percent of all farms	.1	.1	.1	.1	.1	.1	(*)	.1
No electricity, no telephone, and piped running water—farms (000)	18	(*)	2	3	3	3	2	4
percent of all farms	.4	.3	.3	.5	.4	.4	.5	.3
No electricity, telephone, and no piped running water—farms (000)	17	(*)	(*)	2	4	3	3	5
percent of all farms	.4	.1	.1	.3	.5	.4	.6	.3
No electricity, no telephone, and no piped running water—farms (000)	359	4	10	23	48	70	72	132
percent of all farms	7.5	3.2	2.2	3.2	5.8	9.0	15.8	9.1

* Quantity less than half of the smallest unit: less than 500 or less than 0.05 percent.

SOME RESULTS OF FARM MECHANIZATION

Modern mechanization has made the farm a better place to live and to work. Modern farm and home facilities have improved farm sanitation and health conditions of the farm family. They have made farm and home work easier by reducing hand labor and human drudgery. Farm machines and facilities have reduced sizes of crews needed to perform some of the major, labor-consuming farm jobs, and made possible greater use of older and younger workers. Electric lights, piped running water, television, and radio, have provided satisfying influences in keeping good hired hands, and they have aided the farm family in conducting its business, and its educational and social affairs.

Tractors, motortrucks, and automobiles are the three power machines basic to modern mechanization of field work and transportation. Stationary and mounted internal-combustion engines and electric motors are the power units that have modernized the pumping of water for irrigation and for use in the home and farm service areas. The several items of harvest machines, chore equipment, and service equipment previously discussed are only some of the many items used with modern mechanical power units. However, their effects on production and marketing efficiencies in farming have been significant.

Modern mechanization has played an important part in changing production practices, thereby speeding up farming operations and reducing labor requirements. For example, the harvest of small grain is accomplished in a single operation with combine-harvester-thresher and the three tiresome labor-consuming operations involved in the old method of cutting, shocking, and threshing the grain have been eliminated. Timeliness of operation has helped to increase yields and the quality of product, and to reduce waste.

The farm machines and equipment discussed in this report along with many others, have played a very important role in reducing total man-hours used directly in farming from about 24 billion in 1920 to 14.6 billion in 1955, according to estimates by the United States Department of Agriculture. This decrease of almost 40 percent has been accompanied by an increase of 60 percent in farm output for human use. At the same time, farm employment has decreased from 13.4 million workers to 8.2 million workers. So great has been the increase in output per worker that each farmworker now produces enough food, fiber and tobacco for himself and about 19 other persons, while, in 1920 each worker produced enough for himself and about 7.5 other persons. It should be noted here that a part of this apparent increase in farm labor efficiency has resulted from the transfer of some jobs from the farm to off-farm establishments.

Mechanical power with its complement of adapted machines has made possible the handling of larger acreages per worker and per family. From 1920 to 1954, a 40-percent decline in the number of farmworkers resulted in a 67-percent increase in acreage handled per worker, or from 30 acres to 50 acres per worker. During this period the average size of farm in the United States increased from about 148 acres to 242 acres. This increase was largely the result of farm consolidations. Number of farms decreased from 6.4 million in 1920 to 4.8 million in 1954. Thus, fewer families now handle more land, and produce much more product for sale than they did in 1920. They do this with fewer workers and with 40 percent fewer farm man-hours.

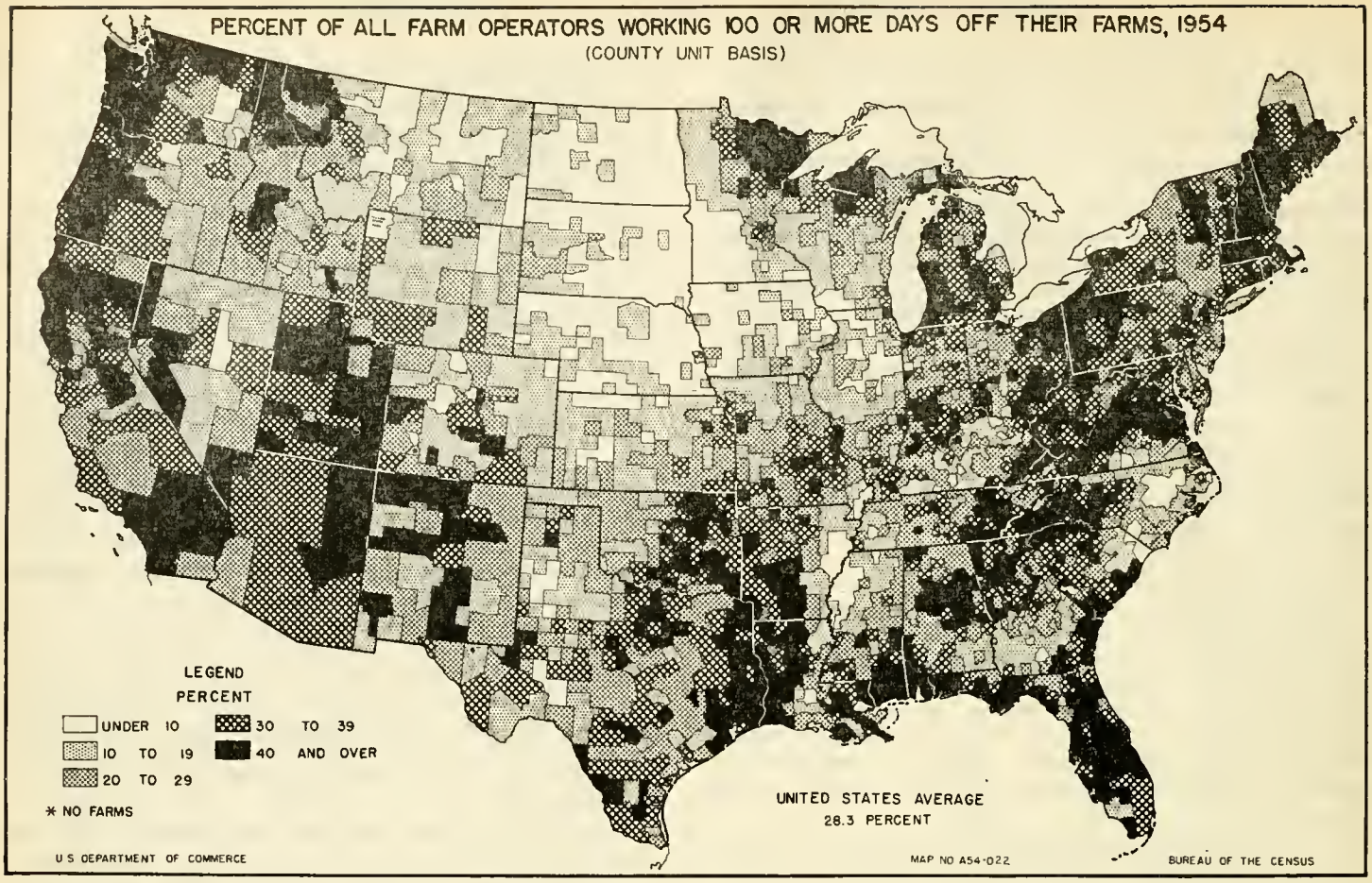
It should be stressed that the increased production per man-hour is not entirely the result of new machines, new types of power, or because of adoption of labor-saving methods. Agricultural production per acre increased between 1920 and 1955 by 22 percent, and livestock production per breeding unit increased by 68 percent during the same period. Each unit of increased production did not require a corresponding increase in man-hours.

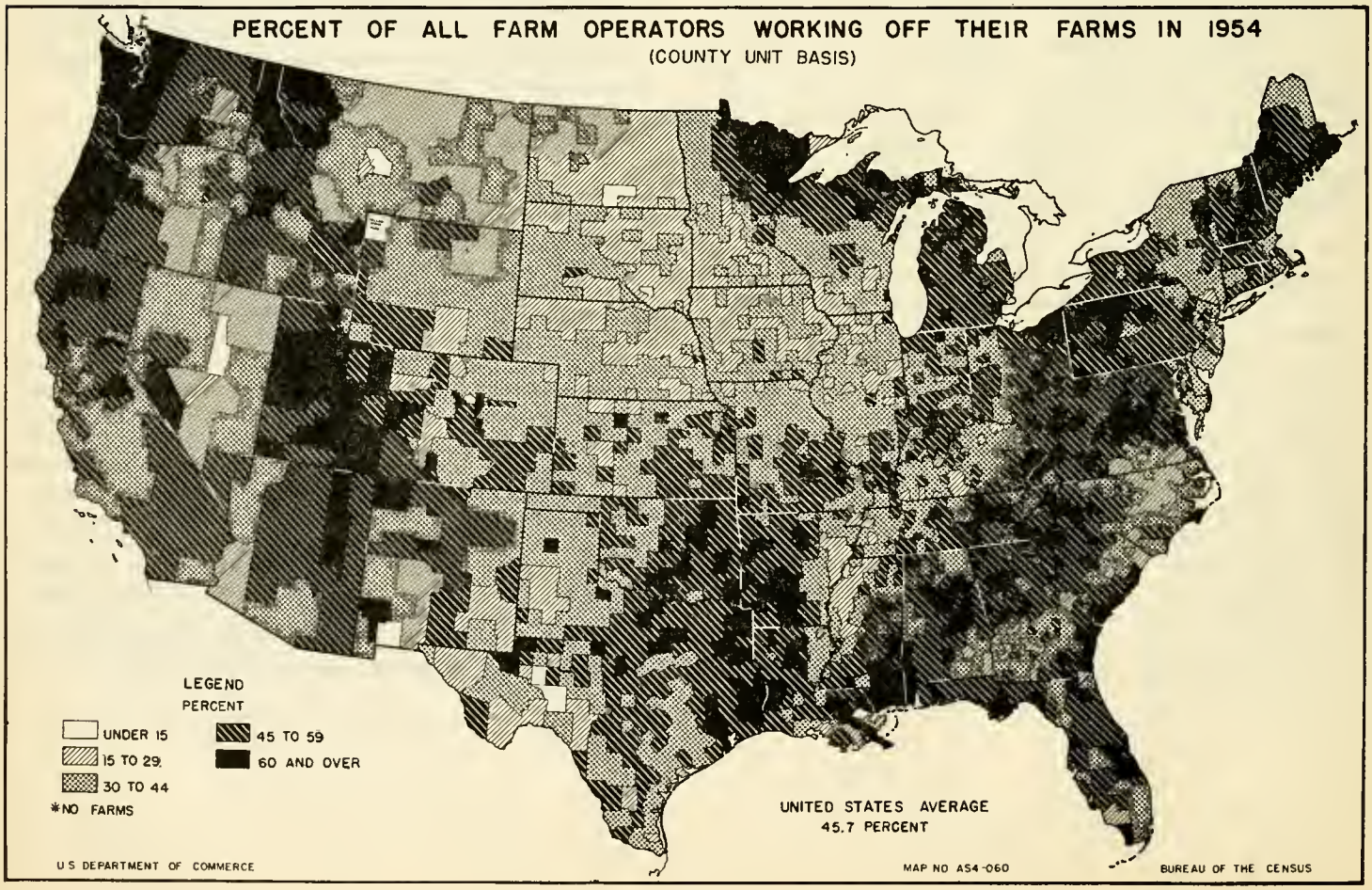
In general, crop production has been more highly mechanized than livestock production. Thus, even though the increase in crop production per acre between 1920 and 1955 was only a third of the increase in production per breeding unit, the actual increase in crop production per man-hour was double the increase in livestock production per man-hour. The largest increases in production per man-hour during the 35-year period occurred in the production of the highly mechanized grain and oil crops. The actual percentage increases were, feed grains, 260 percent; food grains, 360 percent; and oil crops, 425 percent. Three other groups of crops had large increases in production per man-hour. These were, hay and forage crops, 138 percent; sugar crops, 156 percent; and cotton, 188 percent. Although production per acre of vegetables, fruit-and-nut crops, and tobacco has increased markedly, the large amount of handwork in weeding, pruning, picking, etc. has kept increases in production per man-hour relatively lower than for other crops. Decreases since 1920 in production per man-hour have amounted to only 43 percent for tobacco, 52 percent for fruits and nuts, and 65 percent for all vegetables. Increases in livestock production per man-hour have been largest for milk cows and poultry, amounting to 80 and 90 percent, respectively. The corresponding increase for meat animals, primarily hogs and beef cattle, was only 29 percent.

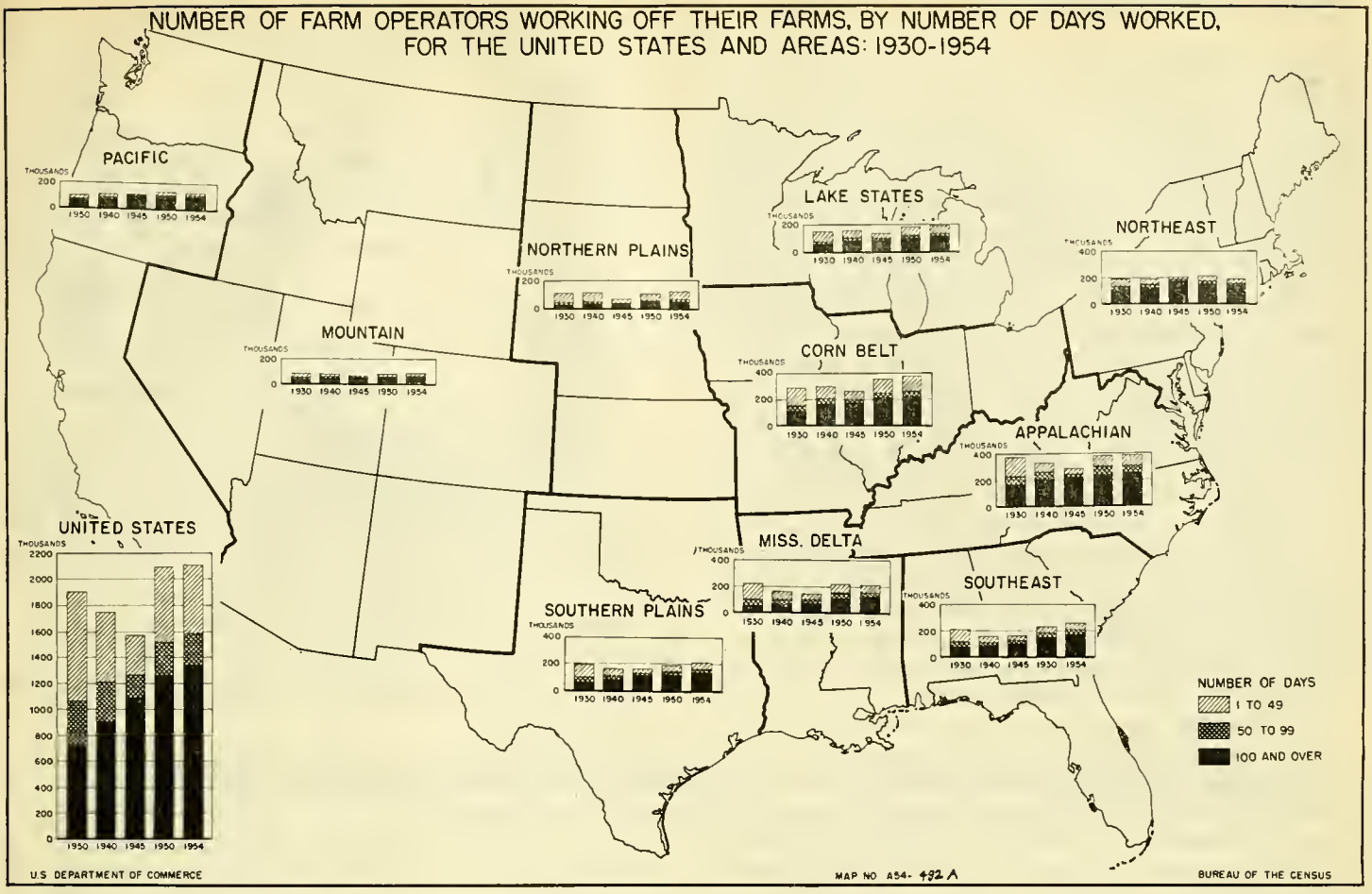
Modern mechanization has given many small farmers, and large operators too, an opportunity to add to their farm income by working off the farm for pay. But at the same time mechanization has increased the farmer's costs for machinery and power, machine hire, and for petroleum products. Census data bearing on these 3 phases of "some results of farm mechanization" are presented in the following discussion.

MORE WORK OFF THE FARM

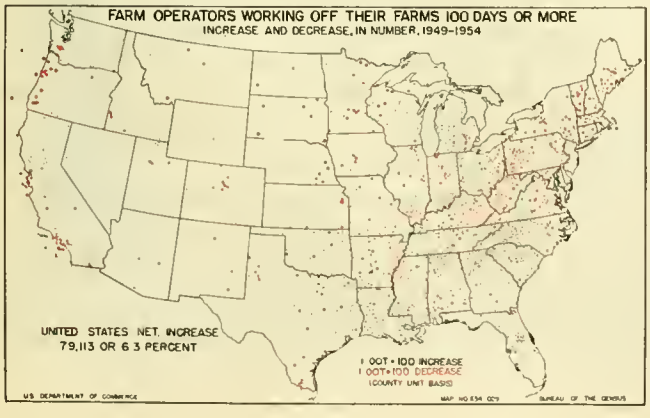
The number of farm operators working off the farm 100 days has increased steadily from Census to Census, from about 700,000 in 1930 to 1,334,000 in 1954. This is evidence of the influence of technology—farm and nonfarm—on the off-farm labor market. Mechanization and related developments have paved the way for a significant migration out of agriculture and in a space of 25 years have helped in doubling the number of farm operators working off the farm 100 days or more. However, improved highways and automobiles, and other improvements in transportation and communications have brought farm people closer to industry and other jobs and have created increased nonfarm jobs for farmers and members of their families. Industry has become widely dispersed in many areas that were largely rural a few decades ago. In the Northeast and more recently in the rural areas of the South, increased off-farm employment has been brought about largely by new job opportunities in industry. Undoubtedly the increase from 1949 to 1954 of almost 70,000 in the operators of Classes I to VI farms (farms with a value of farm products sold of $1,200 or more) working off the farm was influenced greatly by increases in farm mechanization.


PERCENT OF ALL FARM OPERATORS WORKING 100 OR MORE DAYS OFF THEIR FARMS, 1954
(COUNTY UNIT BASIS)
LEGEND
PERCENT
UNDER 10
10 TO 19
20 TO 29
30 TO 39
40 AND OVER
* NO FARMS
UNITED STATES AVERAGE
28.3 PERCENT
U S DEPARTMENT OF COMMERCE
MAP NO A54-022
BUREAU OF THE CENSUS


PERCENT OF ALL FARM OPERATORS WORKING OFF THEIR FARMS IN 1954
(COUNTY UNIT BASIS)
LEGEND
PERCENT
UNDER 15
15 TO 29
30 TO 44
45 TO 59
60 AND OVER
*NO FARMS
UNITED STATES AVERAGE
45.7 PERCENT
U S DEPARTMENT OF COMMERCE
MAP NO A54-060
BUREAU OF THE CENSUS



Although the number of farms in the aggregate has been declining, the number of farm operators working off their farms has been increasing. For example the number of operators working 100 days or more off their farms increased from 944,000 in 1940 to 1,256,000 in 1949 and to 1,334,000 in 1954. More than one-fourth of this increase was realized in the Southeast area where the number of operators who worked off their farms 100 days or more, more than doubled between 1940 and 1954. This is a reflection in a large part of the rapid industrial development in the area.



In some sections, such as eastern Kentucky, portions of West Virginia and western Pennsylvania, some counties have had a decline in the number of operators working 100 days or more off their farms. Most of this decline apparently is due to the decrease in number of farms rather than to a decrease in off-farm jobs.

MACHINERY INVESTMENT COSTS HAVE INCREASED

Modern farm mechanization, reduced labor requirements, and greater opportunities for off-farm employment have been realized through increased investment and operating costs for farm machinery and equipment. In 1956, physical assets of machinery and motor vehicles on farms was valued at 16.6 billion dollars, compared with a value of 3.1 billion dollars in 1940, according to estimates by the United States Department of Agriculture. Partially offsetting this tremendous increase in investment in farm machinery and equipment was a decrease of a billion dollars in value of horses and mules on farms. A part of the increase in value of machinery and equipment is due to increased prices. Increasing inventory values have been accompanied by increasing prices of farm products. In 1951, prices received by farmers were 200 percent above the average for 1940, and in September 1956, they were 136 percent higher than in 1940. There are, of course, many other economic and other factors involved in the progress of farm mechanization and labor productivity. Farmers' expenditures for machine hire and petroleum products provide two indicators of the progress of farm mechanization.

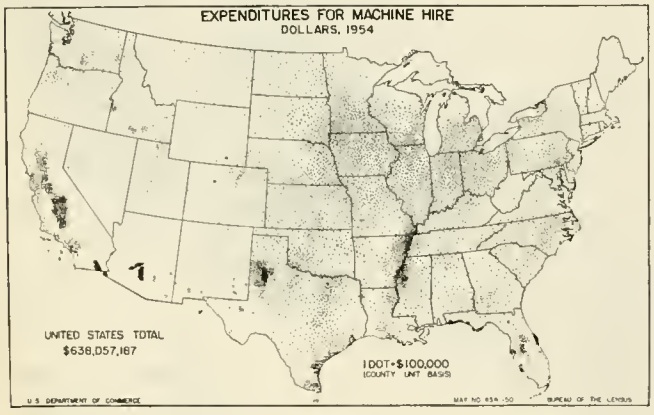
PURCHASED MACHINE WORK HAS INCREASED

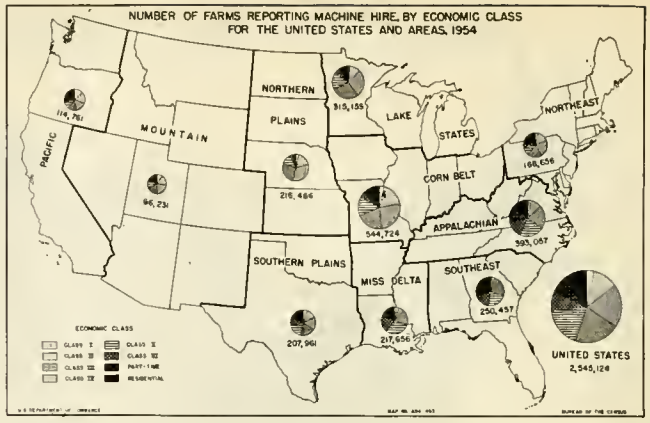
During early settlement of our country, most farm tools were simple and most farmers owned their own equipment or borrowed from their neighbors. Rarely did a farmer pay cash for a machine to work on his farm. With the coming of the grain reaper, the steam-powered thrashing machine, and other kinds of costly machines, it became customary for farmers to hire machines for certain kinds of work. As mechanization progressed and the cost of fully equipping a farm increased, the practice of hiring some machine work became general in practically all farming sections. In 1954, almost two-thirds of the commercial farms and one-third of all other farms reported some expense for machine hire. Heavy concentration of machine hire in 1954 was reported in the Mississippi River Delta and in several important western irrigation farming areas.

As machines become more specialized, it is probable that the hiring of machine work by farmers will become even more general. Frequently a farmer will buy a machine realizing that he does not have enough use for it on his own farm to make it pay and expecting to use it for hire on other farms in the neighborhood. Numerous firms that make a business of doing machine work for farmers have been established. Airplanes used for seeding, dusting, and spraying, and earth-moving equipment are examples of machines often provided by nonfarm firms. Hay balers, grain combines, and forage harvesters often used for custom work are usually owned by farmers.

Hiring a machine usually involves hiring some labor, too, as it is often customary for the owner of the machine to also provide all or a part of the crew for its operation.

Farms reporting machine hire in 1954 ranged from almost 70 percent of all farms in the Lake States to about 45 percent in the Appalachian area. Farms of all economic classes reported some machine hire. Between 60 and 68 percent of the farms of Economic Classes I, II, III, and IV hired some machine work done. These are the farms that, for the most part, are large enough to use machines effectively. Less than 60 percent of the farms of Class V and less than 50 percent of those of Class VI reported any machine hire in 1954. This low rate of machine hire applies to a relatively large number of farms with very small scale of operation. Almost half of the part-time farms hired some machine work. (The small amount of harvest work to be done on many of these places may not justify owning such expensive equipment as hay balers, forage harvesters, or corn pickers.)





Farmers spent about $638,000,000 for machine hire in 1954, an average of about $135 for every farm in the United States. Most of this expense was incurred in the farming areas where relatively costly and complicated machines are used in field operations. The Corn Belt, with almost $119,000,000, led other areas in total expense for machine hire. The highest costs per farm were in the Pacific and Mountain areas where expenditures for all farms averaged $316 and $308, respectively.

More than 80 percent of the total cost of machine hire was for farms of classes I, II, III, and IV. Part-time and residential farms representing 30 percent of all farms accounted for only 5 percent of the total.

Average expenditure per farm reporting machine hire was about $250 in 1954, up almost $30 per farm since 1950.

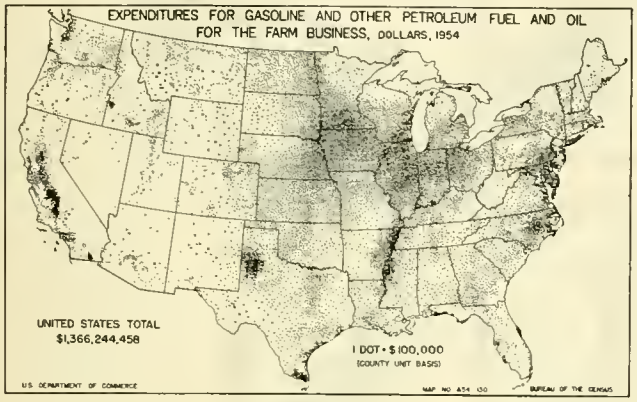
For Class I farms the average expenditure for machine hire was $1,676, or almost 4 times as much as for farms of Class II. Almost one-half of the total expenditure by Class I farms for machine hire was in the Mountain and Pacific areas. Many of these farms are very large and highly specialized. For some farm operations, operators of these farms prefer to use custom-work rather than to own the machines and hire crews to operate them.

GREATER DEPENDENCE ON PETROLEUM FUEL AND OIL

Power for farmwork provided by horses and mules and oxen was farm produced. Now that most of the power is provided by motors, the farmer must buy it. More cash is required to farm now than was required when the farmer produced his own power. It has been estimated that 80 million acres of cropland that once produced feed for horses and mules has been released for other purposes by the adoption of tractors, motortrucks, and automobiles. On the other hand, farmers spent during 1954 about one and a third billion dollars for gasoline and other petroleum fuel and oil used in the farm business. This is for farming purposes only. A part of these expenditures were for petroleum fuels used for such purposes as heating orchards, brooding chicks, and heating water, but most all of the total was used in equipment powered by internal-combustion engines.

Thus, farmers have become almost entirely dependent on petroleum products for most of their farm operations. They are no longer able to switch from mechanical to animal power in their field and road operations. Although electric motors are helping more and more in the stationary power jobs in the service areas, full-scale farm production is possible only when the necessary supply of petroleum products is available.

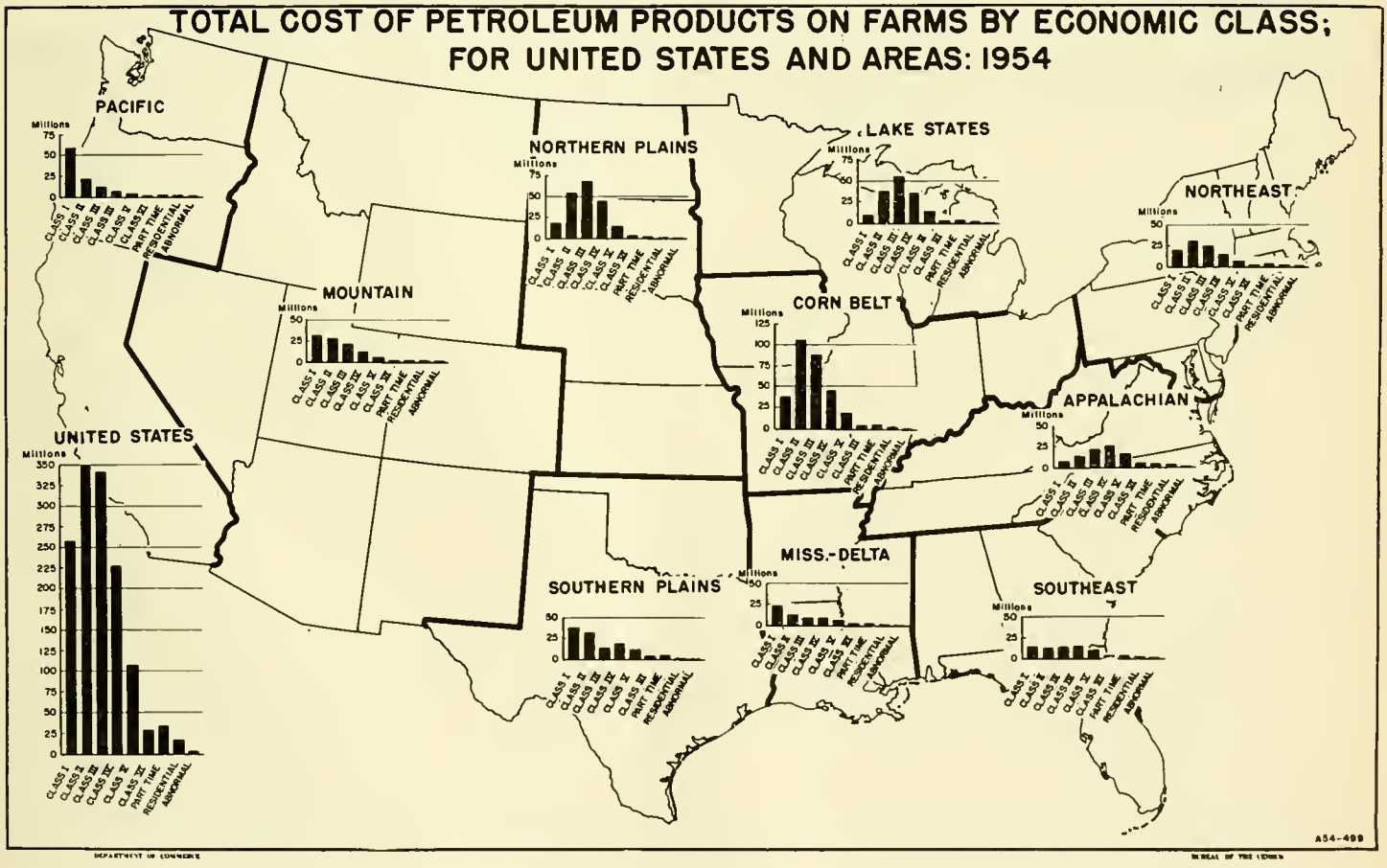
The geographic distribution of expenditures for petroleum fuel and oil followed, in a general way, the distribution of tractors. There were some exceptions, however, as in the High Plains cotton area of Texas where pumping water for irrigation and intensive farming may have accounted for part of the concentration of expenditures for petroleum products. The Corn Belt had 26 percent of the tractors reported on farms in 1954 and 22 percent of the expenditures for petroleum fuel and oil. The Northern Plains, where many of the tractors are relatively large, had 13 percent of the tractors and 15 percent of the expenditures for petroleum fuel and oil.

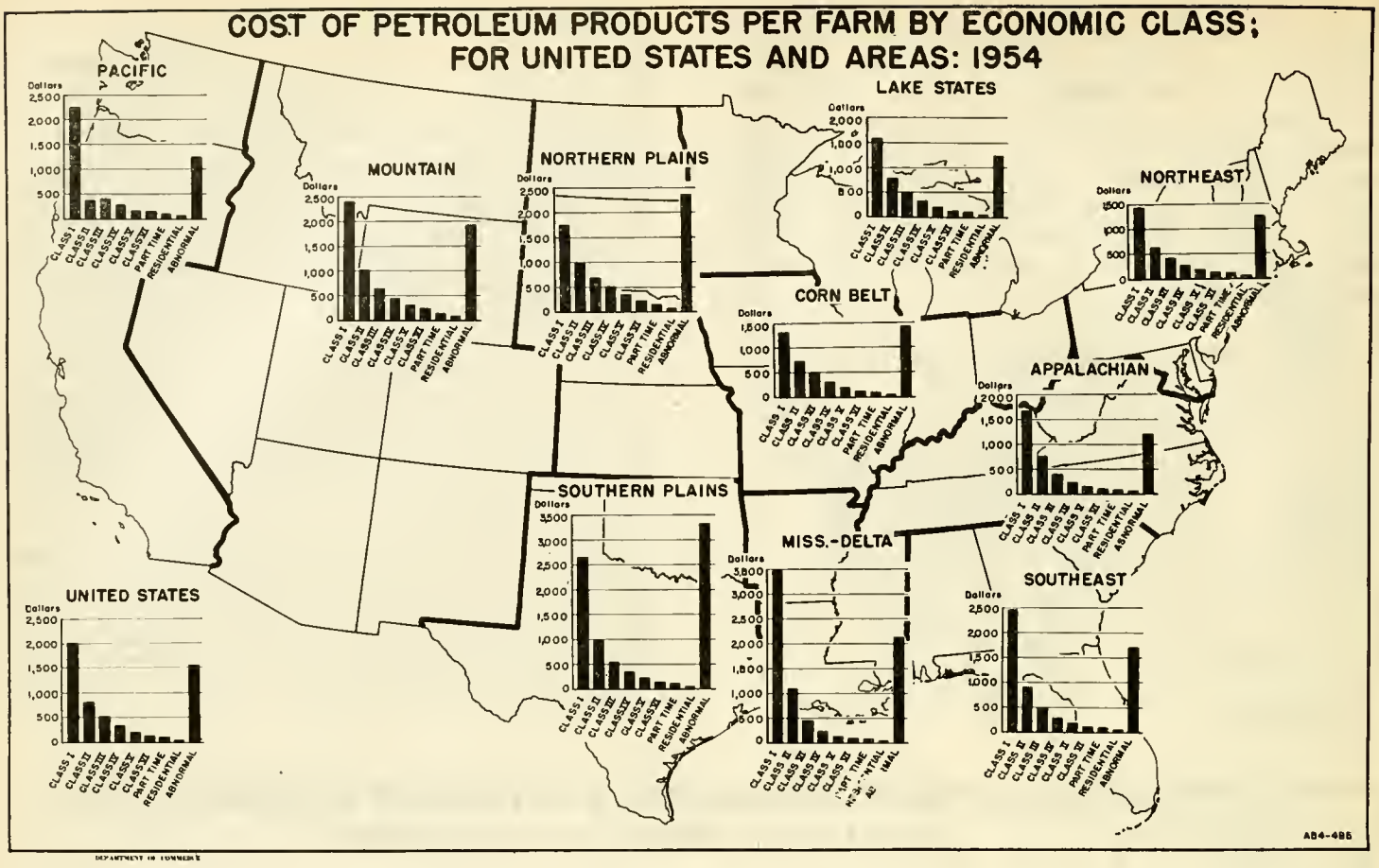


Farms in the higher income economic classes use more equipment than do those in the lower income economic classes. Class I farms, for example, had 10 percent of the tractors reported in 1954 and bought 19 percent of all petroleum products used on farms, while Class VI farms had 4 percent of the tractors and 2 percent of the expense for petroleum products. Part-time and residential farms reported 11 percent of all tractors and 4 percent of the total expenditure for petroleum products. The overall United States pattern of costs of petroleum products by economic class of farm is similar to the patterns in the Northern Plains, Corn Belt, and Lake States. In other areas the tendency is for larger proportions of the total cost to be borne by farmers in the higher economic class groups.

In 1954, farmers spent an average of $418 per farm reporting for gasoline and other petroleum products used in farming operations. This cost ranged from an average of almost $700 per farm in the Mountain States to only $220 in the Appalachian area. Many of the farms in the Mountain area are large, are located considerable distances from trading centers and markets, and are well equipped with tractors, trucks, self-propelled combines, and automobiles.

On a per-farm basis, Class I farms spent an average of $2,000 per farm for petroleum products in 1954. This was more than double the average expenditure by Class II farms and 15 times the average of Class VI farms. Average expenditures of abnormal farms was about $1,550 per farm but because of their small number they accounted for less than 1 percent of the total farm costs for petroleum products.




COST OF PETROLEUM PRODUCTS PER FARM BY ECONOMIC CLASS; FOR UNITED STATES AND AREAS: 1954
PACIFIC
MOUNTAIN
NORTHERN PLAINS
LAKE STATES
NORTHEAST
CORN BELT
APPALACHIAN
SOUTHERN PLAINS
MISS.-DELTA
SOUTHEAST
UNITED STATES
Dollars
CLASS I
CLASS II
CLASS III
CLASS IV
CLASS V
CLASS VI
PART TIME
RESIDENTIAL
ABNORMAL
AB4-485

CHAPTER 3

FARM TENURE

SUMMARY OF CONTENTS

	Page
INTRODUCTION	125
DEFINITIONS AND EXPLANATIONS	126
SECTION I, LAND	127
SECTION II, PRODUCTION	151
SECTION III, PEOPLE	171
DIRECTORY OF TENURE DATA, 1954 CENSUS	191

Section I—Land

Land in farms:
- Percent of total land area in farms, 1954 — 128
- Land in farms as a percent of total land area, United States and regions, 1880–1954 — 129

Land ownership:
- Ownership of land and land in farms, United States, 1954 — 130

Tenure of farmland:
- Land in farms, by tenure of operator, United States, 1954 — 131
- Land in farms operated by tenants, by class of tenant, United States, 1954 — 132
- Percent of farms and farmland operated by tenants, and percent of total farmland under lease, United States and regions, 1880–1954 — 133
- Percent of all land in farms operated under lease, 1954 — 134
- Counties in which at least half of the land in farms was under lease to the operator, 1910–1954 — 135

Tenure of farms:
- Number of farms, by tenure of operator, United States and regions, 1880–1954 — 136
- Number of farms, by tenure of operator, 1954 — 137
- Comparison of changes in number of farms, by tenure of operator, United States, 1945–1950 and 1950–1954 — 138

Tenure of farms—Continued
- Changes in number of farms, by color and tenure of operator, South, 1950–1954 — 139
- Percentage of all farms operated by tenants, 1954 — 140
- Counties in which at least half the farms were operated by tenants, 1880–1954 — 141
- Most frequent method of renting farms, 1954 — 141
- Percent of rented farms, by class of tenant, United States and regions, 1950 and 1954 — 142
- Farms operated by class of tenant, 1954 — 143

Value of land and buildings:
- Value of land and buildings, by tenure of operator, United States and regions, 1900–1954 — 144
- Average value of land and buildings per acre, 1954 — 145
- Average value of land and buildings per acre—increase and decrease, 1950–1954 — 145
- Average value of land and buildings per farm, by tenure of operator, United States and regions, 1950 and 1954 — 146

Multiple-unit operations:
- Subunits in multiple units as a percent of all farms, 1954 — 147
- Cotton acreage harvested in multiple units as a percent of total cotton acreage harvested, 1954 — 148
- Tobacco acreage harvested in multiple units as a percent of total tobacco acreage harvested, 1954 — 149

Section II—Production

Type of farming:
- Type-of-farming areas, based on type accounting for 50 percent or more of commercial farms, 1954 — 153
- Percent of farms in each type-of-farm group, by tenure of operator, commercial farms, United States, 1954 — 154

Crop and livestock output:
- Percent of value of specified crops and livestock sold, by tenure of operator for commercial farms, United States, 1954 — 155
- Percent of cropland harvested represented by acres harvested of the principal crops, by tenure of operator, for commercial farms, United States and regions, 1954 — 156
- Percent distribution of acres of the principal crops harvested, by tenure of operator, for commercial farms, United States and regions, 1954 — 157

Land use:
- Percent distribution of all land in farms according to major uses, by tenure of operator, United States, 1945–1954 — 158
- Percent distribution of cropland, land pastured, and woodland, by tenure of operator, for commercial farms, United States and regions, 1954 — 159

Size of farm:
- Average size of farm, by tenure of operator, United States and regions, 1900–1954 — 160
- Percent distribution of size group of cropland harvested, by tenure of operator, for commercial farms, United States and regions, 1954 — 161

Irrigation:
- Irrigated land as a percent of all land in farms for 20 States, 1954 — 162
- Percent distribution of irrigated farms, by tenure of operator, 17 Western States, Arkansas, Louisiana, and Florida, 1954 and 1950 — 163

Irrigation—Continued
- Percent distribution of irrigated land in farms, by tenure of operator, 17 Western States, Arkansas, Louisiana, and Florida, 1954 and 1950 — 163

Farm labor:
- Number of family workers (including operator) and hired workers per farm reporting, commercial farms, by tenure of operator, United States and regions, 1954 — 164
- Expenditure for hired labor per commercial farm, by tenure of operator, United States and regions, 1954 — 165

Equipment and fertilizer:
- Percent of farms reporting tractors (other than garden) by tenure of operator, commercial farms, United States and regions: 1954 and 1950 — 166
- Number of commercial farms by class of work power and tenure of operator, United States and regions, 1954 — 167
- Tractors on farms, number, 1954 — 167
- Percent of commercial farms reporting tractors, combines, milking machines, corn pickers, and pick-up balers, by tenure of operator, United States and regions, 1954 — 168
- Percent of farms using commercial fertilizer, by tenure, commercial farms, United States and regions, 1954 — 169
- Average expenditure per acre for commercial fertilizer and fertilizer material, by tenure of operator, commercial farms, United States and regions, 1954 — 169

Specified farm expenditures:
- Average expenditure per commercial farm for specified cost items, by tenure of operator, United States and regions, 1954 — 170

Section III—People

Page

Farm population:
- Population: Total, nonfarm, and farm, United States, 1910–1954 — 173
- Farm population, United States, 1920–1955 — 173
- Residence of labor force, farm and nonfarm, United States, 1950 — 173
- Migration to and from farms, United States 1920–1953 — 173
- Percentage change in the farm population selected periods, United States and regions, 1920–1954 — 173
- Residence of farm labor force by kind of worker, United States, 1950 — 173
- Tenure of farm workers, United States, 1954 — 173

Farm income and tenure:
- Agricultural net income and nonagricultural net income, United States, 1910–1954 — 174
- Net income from farming received by nonfarm population, United States, 1910–1954 — 174
- Agricultural net income as percent of total National income, United States, 1910–1954 — 174
- Net income of the farm population from farming and nonfarm sources, United States, 1934–1954 — 174
- Percent distribution of commercial farms in each economic class, by tenure of operator, United States and regions, 1954 — 175
- Percent of commercial farms in each tenure group reporting a telephone, electricity, and running water, United States and regions, 1954 — 176

Off-farm employment and part-time farming:
- Percent of all farm operators working off their farms, 1954 — 177
- Farm operators working off their farms 100 days or more—increase and decrease in number, 1949–1954 — 177

Page

Off-farm employment and part-time farming—Continued
- Farm operators with other income of family exceeding value of agricultural products sold, 1954 — 177
- Percent of farm operators working off their farms 100 days or more, by tenure, United States and regions, 1954 and 1950 — 178
- Percent of farm operators with other income of family exceeding the value of farm products sold, by tenure, United States and regions, 1950 and 1954 — 179

Occupancy, mobility, and length of tenure:
- Average number of years on present farms, by tenure of operator, United States and regions, 1954 and 1950 — 180
- Percent distribution of farm operators in each tenure, by years on present farms, United States and regions, 1954 — 181
- Years on farm—number of operators reporting by tenure, United States, 1910–1954 — 182
- Percent of farm operators on present farms 1 year or less, by tenure, United States, 1910–1954 — 182
- Percent of farm operators on present farms 1 year or less by month of occupancy, October to November 1954, United States and regions — 183

Age and residence of farm operators:
- Average age of farm operators, by tenure, United States and regions, 1940–1954 — 184
- Percent of farm operators 55 to 64 years of age, 1954 — 184
- Percent of farm operators 65 years of age and over, 1954 — 184
- Percent distribution of farm operators in each tenure group, by age, United States and regions, 1954 — 185
- Percent distribution of tenant operators in each tenure group, by age, United States and regions, 1954 — 186
- Percent of farm operators reporting residence off their farms, 1954 — 187

INTRODUCTION

This report on farm tenure consists of three sections entitled, respectively, *Land*, *Production*, and *People*. The first section, *Land*, deals with how individuals gain access to the services of agricultural land. The second section, *Production*, relates the tenure system to farm outputs and inputs. Section III, *People*, shows the tenure system as an instrument for dividing farm income among individuals. This portrayal of America's farm tenure structure indicates some of the relationships between tenure arrangements and production and division of farm income in our economy.

Land tenure can be looked upon as a collection of arrangements which, to the individual, may appear to be a scale of degrees of access to land services. At one end of the scale is the *fee simple*, debt-free ownership which permits maximum access to the services of land subject to rights reserved by the public. At the other end of the scale may be such tenure forms as the temporary leaseholder or sharecropper whose legal rights to land may be quite limited.

The means of obtaining or retaining use of, or control over, resources may take many forms. Some of these forms of agricultural land tenure are: Individual ownership, debt-free or encumbered ownership; coownership, such as joint tenancy, tenancy in common, or tenancy by entirety; corporate ownership; estate; trust; public ownership; cash, standing, share, or cropper leasing arrangements; life estates; easements and covenants; employee; and public, noncontractual, reservations of property rights such as eminent domain, taxation, and police power.

It would, of course, be impractical for a Census of Agriculture to enumerate all the possible relationships in the way persons gain access to land even for agricultural purposes. Tenure is usually specified in terms of the relationship of the person performing the farming operation without regard to the degrees of equity. The tenure forms contained in this report represent discrete categories such as full owner, part owner, manager, or tenant. These broad groups of tenure arrangements are necessary for purposes of enumeration and simplification. In reality, of course, tenure is a continuum of relationships which provide various degrees of access to resources. Ownership encumbered with a heavy mortgage may require far more stringent restrictions on land use than debt-free tenancy. Part ownership may consist of many different mixtures of ownership and tenancy.

Adjustments in the tenure structure have taken place in recent years to accommodate changes in agricultural production. The number of farm operators has decreased and farms have become larger. The proportion of farms operated by tenants has decreased and the proportion of part-owner operators has increased. Full owners, although fewer in number, now represent nearly the same proportion of all operators as in 1945. Increasing numbers of farmers are undertaking off-farm employment.

The second section of the report, *Production*, is especially devoted to the relation of tenure to type of farm, land use, crop and livestock output, size of farm, irrigation, equipment and fertilizer, farm expenditures, and farm labor.

Agricultural output has continued to rise while the number of persons employed in agriculture has declined. Production per acre and per animal unit has increased so that, although very little new land was cultivated and relatively small increases took place in livestock numbers, total output increased more than 80 percent from 1910–14 to 1954. Adjustments have been made in the composition of agricultural output and the tenure pattern has changed accordingly. The tenancy pattern, for example, now includes a greater proportion of livestock-share leases partly because of shifts toward expanded livestock enterprises. Tenure adjustments have taken place to accommodate expansion in farm size. Some farmers wishing to use their limited capital for increased quantities of specialized equipment or fertilizer may prefer to rent rather than buy additional land. The number of part owners has increased. Tenure adjustments are necessary when improved techniques, changes in consumer tastes, and changes in the relative quantities of labor, capital, or land alter the value of the various resources in production.

The farm tenure system, through its effects on the return to factors of production, resource mobility, and uncertainty, affects the level and composition of agricultural output. Since every farm operation is, in one way or another, related to tenure arrangements between individuals and to individual property rights as governed by our laws, the entire pattern of agricultural production from the individual farm firm to entire agricultural industry affects and is affected by the tenure structure.

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The terminology used in this report is identieal with that used in the reports for the various Censuses of Agriculture. In the several Censuses it has been necessary to make minor adjustments in the definition of a farm and in the procedures for enumeration, but it is believed that these adjustments are not of sufficient magnitude to affect tenure trends appreciably. In the Census of 1950, a relatively slight change in the definition of a farm caused a decrease of 150,000 to 170,000 in the number of farms which would have been included if the 1945 definition had been retained. The 1954 definition of a farm coincided with that used in 1950. Most of the places excluded by the 1950 and 1954 definition that would have been counted as farms in earlier Censuses are owner-operated.

In all Censuses except 1950, farm operators were classified according to the tenure under which they held their land on the basis of the land they retained. The 1950 procedure, although slightly different, had very little effect on the tenure distribution.

Owners are farm operators who own all or part of the land they operate.

Full owners own all of the land they operate.

Part owners own land they operate and rent, from others, additional land which they operate.

Managers operate farms for others, and are paid a wage or salary for their services.

Tenants rent from others (or work on shares for others) all of the land they operate.

Cash tenants pay cash and no share of crops or livestock as rent, such as $10 per acre or $1,000 for the use of the entire farm.

Share-cash tenants pay a part of the rent in eash and a part as a share of the crops or of the livestock or livestock products, or both.

Share tenants pay a share of either the crops or of the livestock or livestock products, or a share of both. Share tenants were further classified as:

Crop-share tenants if they paid a share of the crops and no share of the livestock or livestock products.

Livestock-share tenants if they paid a share of the livestock or livestock products. They may also have paid a share of the crops.

Croppers are tenants to whom all work power is furnished.

Other tenants include those who pay a fixed quantity of any product; those who pay taxes, keep up the land and buildings, or keep the landlord in exchange for the use of the land; those who have use of the land rent free; and all others whose rental arrangements require payment other than cash or a share of the products.

Unspecified tenants include those tenants whose rental agreement was not reported or could not be determined from the information given.

GEOGRAPHIC REGIONS AND DIVISIONS

Figure 1.

The four geographic regions used in this report are: (*1*) The Northeast, including the 9 States in the New England and Middle Atlantic divisions; (*2*) The North Central, including the 12 States in the East North Central and West North Central divisions; (*3*) The South, including the 16 States in the South Atlantic, East South Central, and West South Central divisions, and (*4*) The West, including the 11 States in the Mountain and Pacific divisions.

Some of the data used herein, particularly those for commereial farms only, are estimates based on reports for a sample of farms. Data that are based on reports for a sample of farms are shown in *italics* or by a note if the data are presented in tabular form. A description of the sampling technique and the reliability of sample data are given in the Introduction to Volume II, "General Report," of the 1954 Census of Agriculture.

Commercial farms are, in general, those with a value of sales of farm products amounting to $1,200 or more. Farms with a value of sales from $250 to $1,199 were also classified as eommercial if the farm operator worked off the farm less than 100 days and if the income which the operator and other members of his family reeeived from nonfarm sourees was less than the total value of farm products sold.

SECTION I

Land

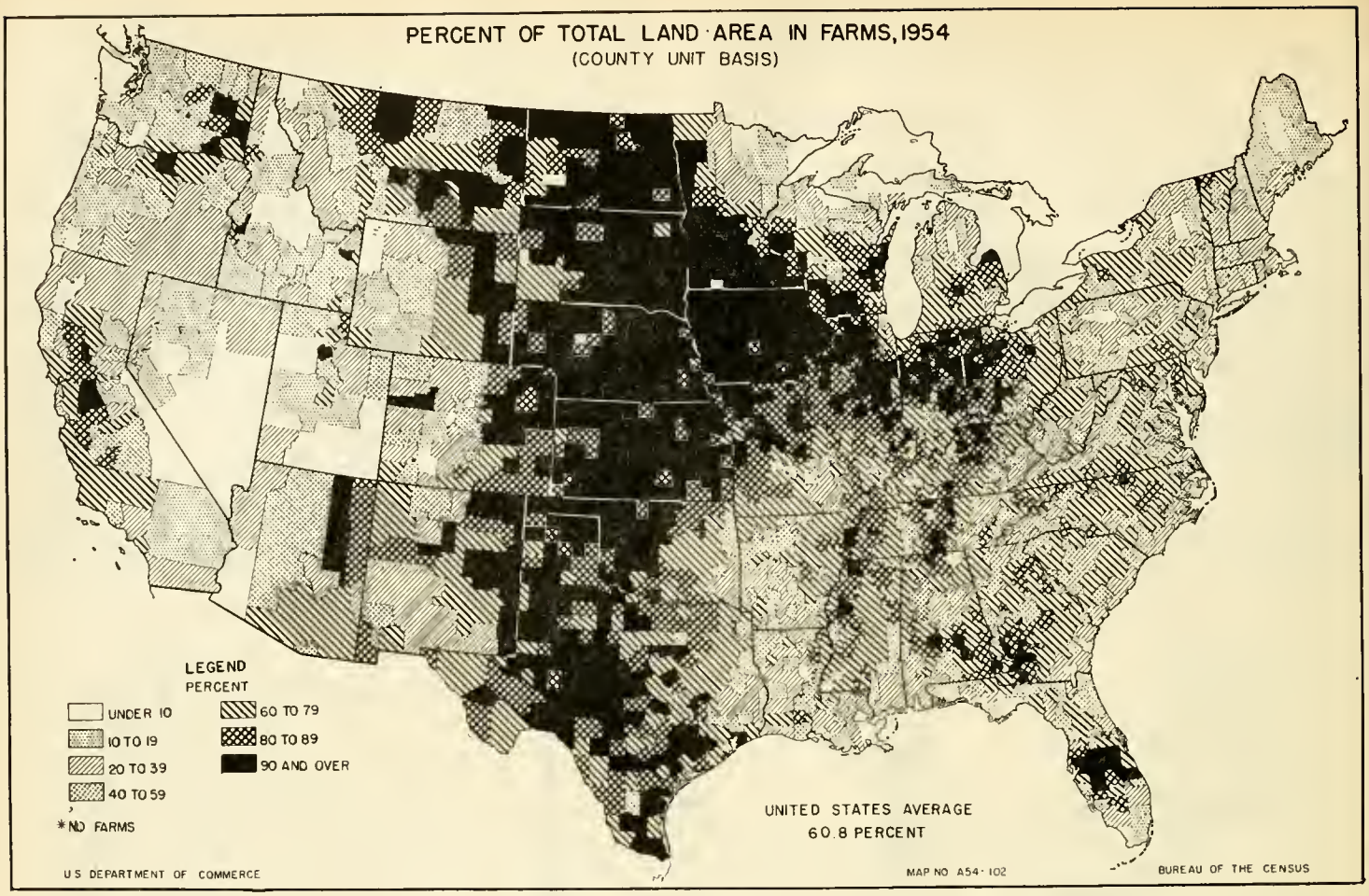

Figure 2.

LAND IN FARMS

The principal agricultural uses of land are for crops and for pasture; however, not all of the land used for agricultural purposes is classed as farmland. Although almost all land in crops is considered farmland, millions of acres of land are used for grazing but are not enumerated as "land in farms." Thus, of the 1,903,824,640 acres of land surface in the United States, 79.4 percent was used for agricultural purposes in 1954, although only 60.8 percent was classified as land in farms. Land not in farms was not used in the tenure classification.

The proportion of the land area in farms showed an upward trend to 1950. The farm area in 1954 was almost the same as in 1950. The relatively stable farm area, for the country as a whole, fails to reveal the differences which have been occurring in the States and in larger geographic regions. Decreases in land in farms, between the 1950 and 1954 enumerations, occurred in all States each of the Mississippi River, except Florida. Although decreases also were reported in five States west of the Mississippi River, the combined loss—nearly 18 million acres—was almost offset by increases in the western half of the country and in Florida.

In the Northeast the downward trend in the land area devoted to agriculture has been almost continuous since 1880. By 1900, this area had 2½ million fewer acres of farmland than at the peak in 1880. From 1900 to 1954 the Northeastern States, collectively, lost another 24 million acres of farmland, or about 3 out of every 8 acres.

The North Central Region comprises one-fourth (25.4 percent) of the total land surface in the continental United States and one-third (34.0 percent) of the farmland. The farm area in this region apparently reached its peak about 1945. At that time, 82.5 percent of the land area was within farm boundaries. Relatively small declines in the acreage in farms have been reported in the two intercensal periods since that time. In the period 1945–54, this region lost more than 5 million acres from its farms so that by 1954 the proportion of land in farms had dropped to 81.4 percent.

The South, which has 29.5 percent of the total land area in the United States, had, in 1954, only slightly more than two-thirds (68.7 percent) of its area in farms. The other third of the area, representing nonagricultural land, is largely ungrazed wooded tracts held by timber or paper companies or in other private holdings; swamps and tidal marshes; rugged terrain some of which is in parks; eroded, abandoned lands once in farms but now overgrown with brush and trees; and, of course, land required by roads, cities, and industrial uses. Although economic forces could bring thousands of acres of these nonagricultural lands into a higher agricultural use through clearing and draining, forestry is the presently preferred use for much of the area.

Following the Civil War, acreage of land in farms in the South increased until 1900, after which date each successive Census through 1925 registered a decline. Thereafter, the trend was upward through 1950. Between 1950 and 1954, this region recorded a loss of nearly 7 million acres from the farm area. This decrease would have been even greater if it had not been for a 1,634,000 increase recorded in Florida. Abandonment of some of the poorer agricultural lands in the South, particularly in the Southern Piedmont and in the more mountainous and hilly areas, has been brought about in part by more attractive opportunities for earning a living through nonfarm employment in industry.

The West has continued the expansion of its farmland area, without interruption, since the first Census of land in farms was

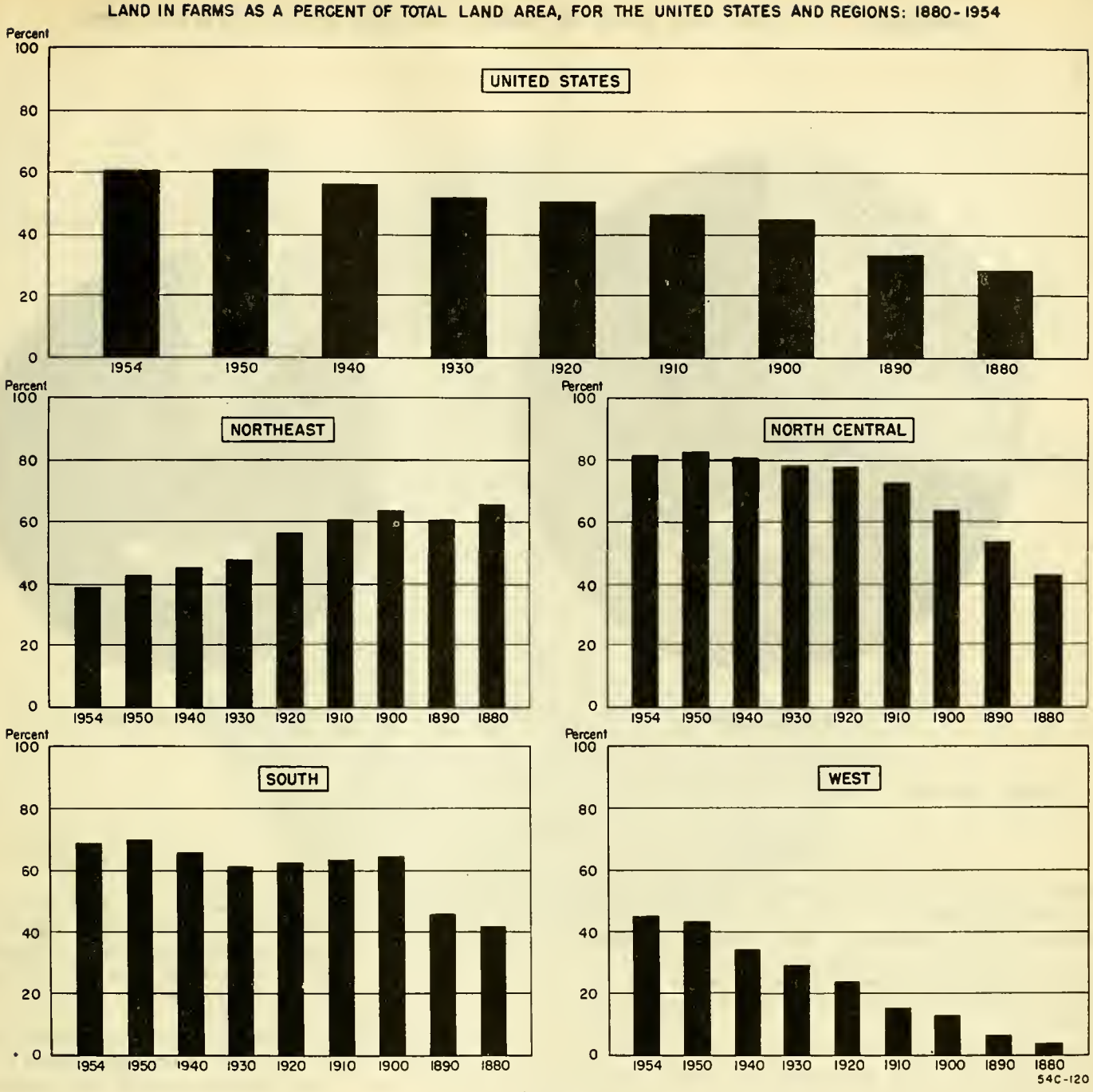

Figure 3.

made in 1850. This region, which comprises nearly two-fifths (39.6 percent) of the United States land area, had only 44.8 percent of its area in farms in 1954. The increase, in the 1950 to 1954 period, approximated 13 million acres or 4.0 percent. Most of the increase in land in farms came about through incorporation of grazing lands into farms.

Since about 1920, new lands used for agriculture represented only a small part of the enlargement of the farm area. Much of the grazing land of the West comprises public domain land grazed under the permit system. This permit land is excluded from enumeration of land in farms, largely because multiple users have access to much of the land. An increasing acreage of the public land has gone over to single users through a leasing arrangement. These leased lands are included in the farmland area. About 17,300,000 acres of land were leased under the Taylor Grazing Act in 1954; this compares with 13 million acres in 1950 and 7,400,000 acres in 1940.

(*Continued on page 188*)

TABLE 1.—LAND IN FARMS AS A PERCENT OF TOTAL LAND AREA, FOR THE UNITED STATES AND REGIONS: 1880 TO 1954

Region	1954	1950	1940	1930	1920	1910	1900	1890	1880
United States	60.8	60.9	55.7	51.8	50.2	46.2	44.1	32.7	28.2
Northeast	39.2	42.4	44.9	47.6	55.5	60.7	63.1	60.5	65.6
North Central	81.4	82.0	80.2	77.8	77.4	72.4	65.6	53.0	42.8
South	68.7	69.9	65.7	61.0	62.3	63.1	64.4	45.6	41.8
West	44.8	43.1	33.9	28.9	23.0	14.7	12.4	6.3	3.5

OWNERSHIP OF LAND AND LAND IN FARMS, FOR THE UNITED STATES: 1954

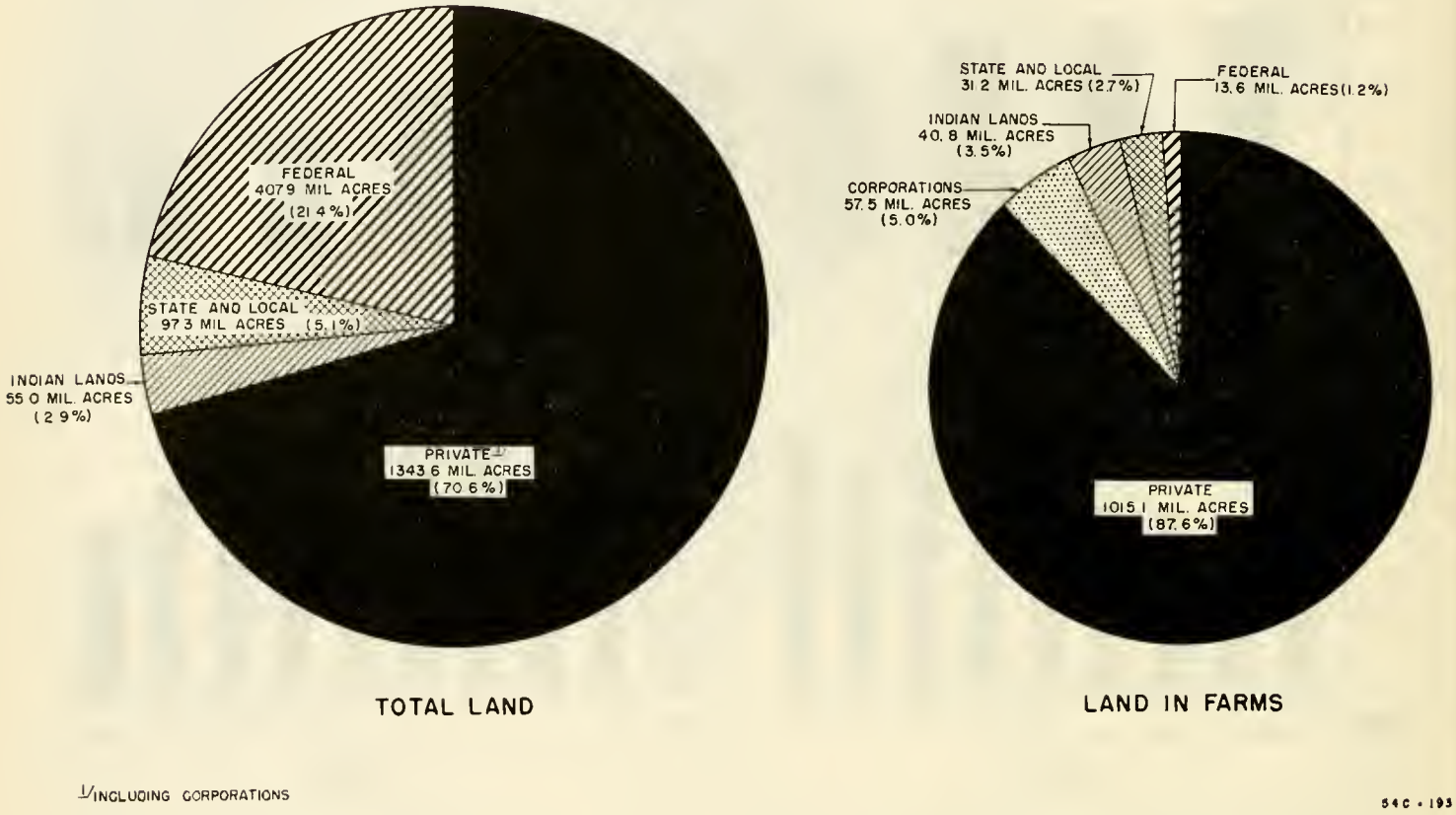

Figure 4.

LAND OWNERSHIP

Public and private ownership.—Although title to more than one-fourth of the land area of the United States rests with Federal, State, or local governments, only 3.9 percent of the land in farms is publicly owned. Most of the land in farms owned by government is of low productivity and the acreage that is employed in agricultural production is devoted almost entirely to grazing.

Of the total land area of continental United States, 407.9 million acres, or 21.4 percent, are owned by the Federal Government; 80.3 million acres, or 4.2 percent are owned by State governments; and an estimated 17 million acres, or 0.9 percent, are owned by local governments. The Federal Government, in addition to the land it owns, also administers 55 million acres of Indian lands. The 11 Western States comprising the Western Region contain 88.5 percent of the Federal land, and the proportion of Federal land in some States—such as Nevada, 87.1 percent; and Utah, 70.2 percent—exceeds one-half the total land area of the State.

Ownership of land in farms.—The land ownership policy of the United States, after the Preemption Act of 1830, is characterized by its emphasis on the maximization of fee simple ownership by individuals. With the exception of the lands of the 13 original colonies and the present borders of Texas, most of the land in the United States has at some time been owned by the Federal Government. To promote the settlement and development of this country the Federal Government disposed of much of its land to States, schools, railroads, and individuals with the result that much of the land now under the direct control of the Federal Government is either in no economic use or in uses of general rather than individual interest. The principal exceptions, of course, are timber and grazing lands.

The two principal agencies which deal with the use of Federal grazing lands are the Forest Service, Department of Agriculture, and the Bureau of Land Management, Department of Interior. The Forest Service in 1954 was responsible for permits and leases on 77.1 million acres of grazing land, and the Bureau of Land Management, for 175.7 million acres.

Grazing land held by individual ranchers on a permit basis from the Forest Service and Bureau of Land Management is not included in "land in farms" as determined by the Censuses of Agriculture.

(*Continued on page 188*)

TABLE 2.—ALL LAND AND LAND IN FARMS BY TYPE OF OWNER, FOR THE UNITED STATES: 1954

[Land in farms by type of owner based on a sample of approximately 200,000 farms]

Type of owner	All land (farm and nonfarm)		Land in farms		Percent in farms
	Million acres	Percent distribution	Million acres	Percent distribution	
Total	1,903.8	100.0	1,158.2	100.0	60.8
Private, including corporate	1,343.6	70.6	1,072.6	92.6	79.8
Private	(NA)	(NA)	1,015.1	87.6	(NA)
Corporate	(NA)	(NA)	57.5	5.0	(NA)
Public	560.2	29.4	85.6	7.4	15.3
Federal	407.9	21.4	13.6	1.2	3.3
State and local governments	97.3	5.1	31.2	2.7	32.1
Indian lands	55.0	2.9	40.8	3.5	74.2

NA Not available.

LAND IN FARMS, BY TENURE OF OPERATOR, FOR THE UNITED STATES: 1954

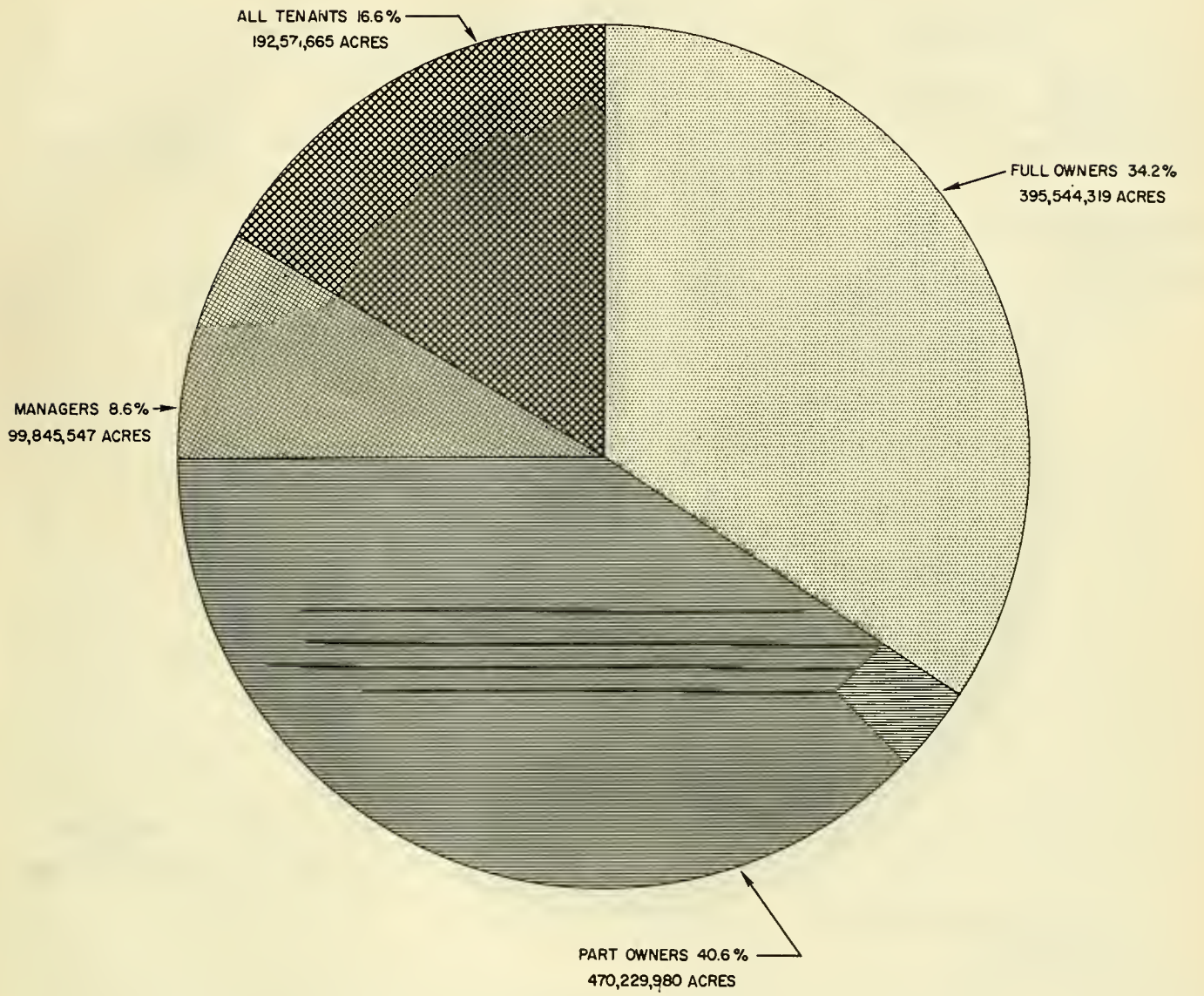

Figure 5.

TENURE OF FARMLAND

Access to farmland.—Farm operators generally gain access to the services of land in two ways; first, in perpetuity through ownership and second, for a term through lease. About one-half of the farmland in the United States, in 1954, was in farms in which only one general method, either ownership or tenancy, was used by operators. However, part-owner farms, containing both owned land and rented land, occupy a larger portion of the farmland than any other single tenure type. This mixed tenure is currently increasing in importance both in terms of land in farms and in number of farms.

Land in farms is not, however, all of the same quality. Proportions of the land area alone do not show the relative productivity of the land in the various tenure groups. We find a high rate of tenancy in fertile regions such as the Corn Belt and the Delta. In the less fertile areas we find the more extensive livestock operations of managers. Some evidence of this quality differential by tenure is seen in the variation in the per-acre value of land.

It is estimated that *89.0* percent of the *1,160,043,854* acres of farmland is contained in commercial farms and the remainder in other farms. Commercial full-owner farms contained *28.5* percent of the total farmland; part-owner farms, *39.7* percent; manager farms, *5.2* percent; and tenant farms, *15.6* percent. Since commercial farms produce about *98* percent of the value of farm products sold, they account for a larger proportion of the products sold than of the farmland.

LAND IN FARMS OPERATED BY TENANTS, BY CLASS OF TENANT, FOR THE UNITED STATES: 1954

(DATA ARE BASED ON REPORTS FOR ONLY A SAMPLE OF FARMS)

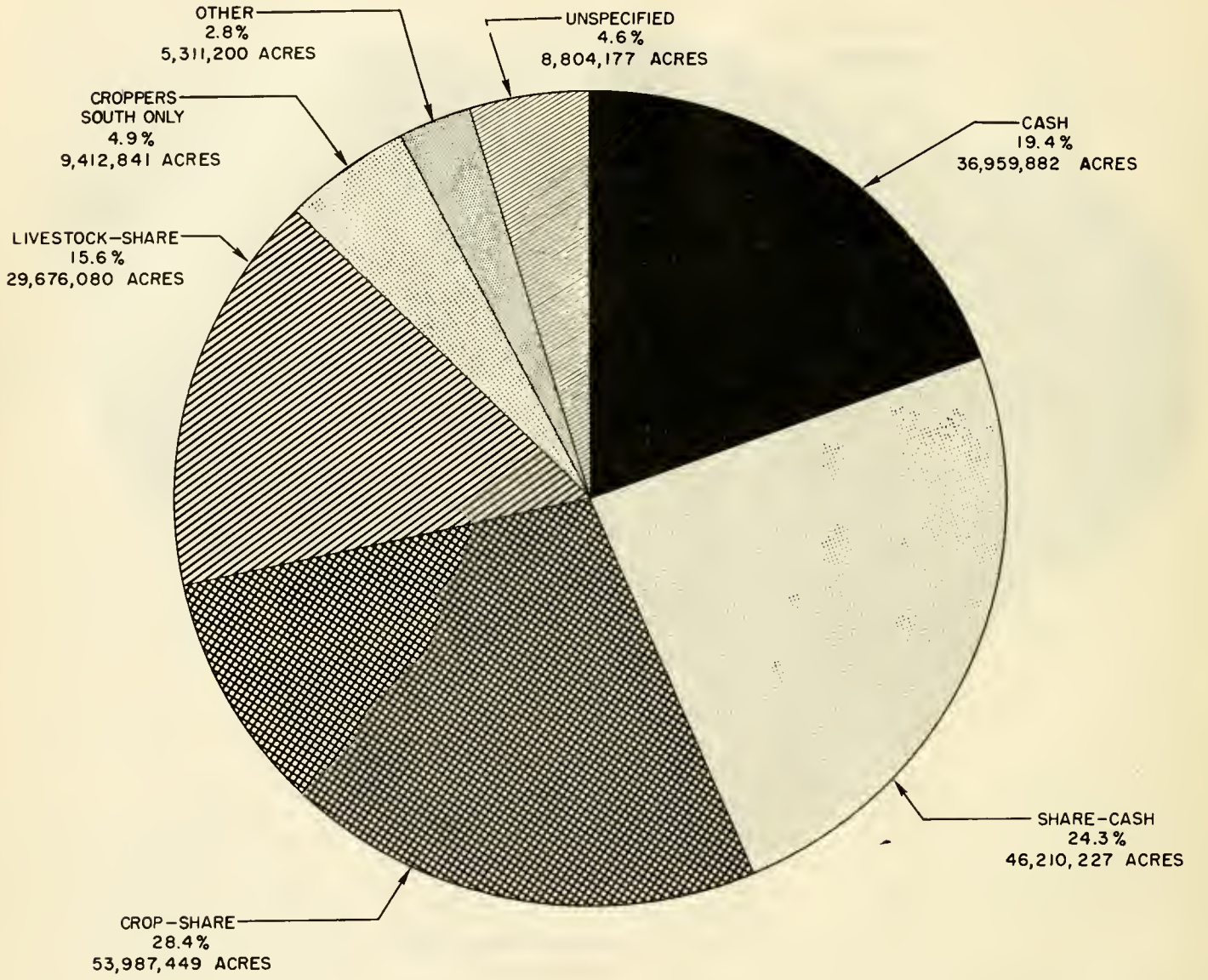

Figure 6.

Land farmed by various classes of tenants.—Leasing arrangements are characterized by the form of rental payment. Rentals are almost always either a fixed commitment in cash or produce or a share of the produce. Share agreements also frequently contain a provision for the sharing of certain operational expenses.

Most of the land in tenant-operated farms is leased under some form of share arrangement. Sharing may be restricted to crop production only, or to livestock and/or livestock products only; it may include a share of both crops and livestock or livestock products; or it may include a share of either or both crops and livestock and an additional cash payment for pasture, feed crops, or a dwelling. Crop-share arrangements—those in which landlord and tenant shared in all crops but in none of the livestock—had the largest share of land in tenant-operated farms. Their holdings amounted to *53,987,449* acres, or *28.4* percent of all tenant-operated farmland, in 1954. The share-cash leases followed with *46,210,227* acres, or *24.3* percent. Livestock-share tenants had *29,676,080* acres in farms. Sharecropping represents another version of a share arrangement. In this case, the landlord furnishes all of the workstock or tractor power as a part of his share in the operation of the sharecropper farm. Sharecropper lands in the South, totaling *9,412,841* acres, represented *4.9* percent of the United States total for land in tenant-operated farms.

Cash tenants, those paying cash as rent and no share of crops or livestock, operated *19.4* percent of all land in tenant-operated farms in 1954. Other tenants include those who pay a fixed quantity of product, those who maintain the land and buildings in exchange for rent, and those who use the land rent-free. This combined group had *5,311,200* acres or *2.8* percent of the total.

(Continued on page 188)

PERCENT OF FARMS AND FARM LAND OPERATED BY TENANTS, AND PERCENT OF TOTAL FARM LAND UNDER LEASE, FOR THE UNITED STATES AND REGIONS: 1880-1954

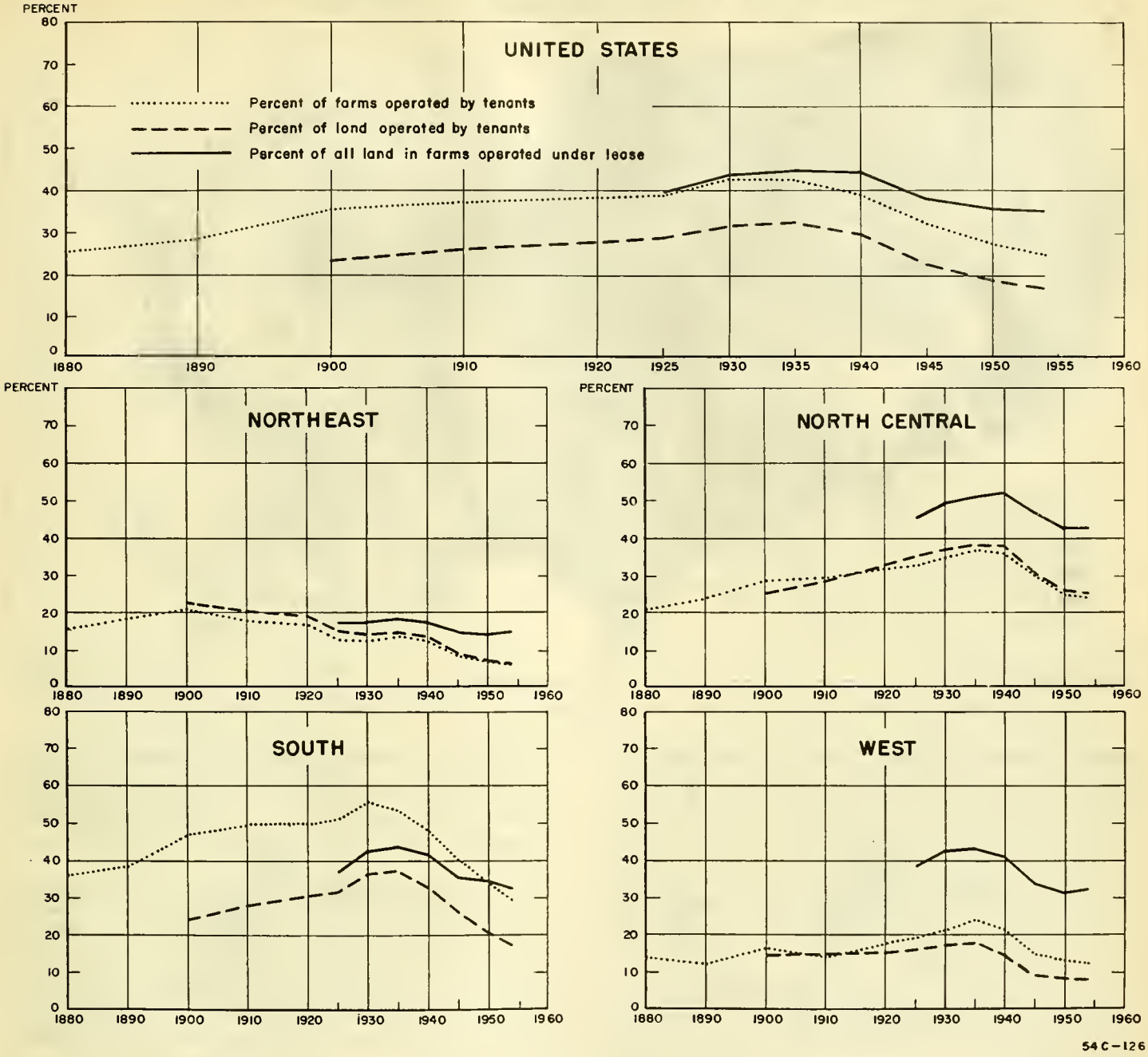

Figure 7.

Changes in land under lease.—In 1954, land operated under some form of tenancy arrangement approximated 400 million acres, or about 35 percent of the total farm acreage. Slightly more than one-half of the 400 million acres were operated by part owners and the remainder by tenants. This was the first time that land leased by part owners exceeded that operated by tenants. The 190 million total for tenants in 1954 includes a relatively small acreage (less than 9½ million acres) operated by sharecroppers in the South.

A decreasing proportion of the land in farms has been under lease (used in its broadest sense) since 1935, when nearly 45 percent of all farmland was in this category. The proportion of the farm area operated by tenants increased steadily from the turn of this century through 1935, at which point tenants operated 31.9 percent of the farmland. Thereafter, in each successive Census both a smaller acreage and a smaller percentage of the farmland have been in the control of tenants. By 1954 this percentage was down to *16.4*. On the other hand, leased land operated by part owners has steadily increased since 1935 both in absolute acreage and in proportion to the total acreage for all farm operators. The percentage leased by part owners in 1935 was 12.7 and by 1954 it exceeded *18* percent.

A considerable amount of capital is required by a farm operator who gives or contemplates giving his full attention to farm production. With a given amount of capital and available credit, he has some choice as to the amount of land he will farm. He may become a tenant or an operating owner. In order to use an ever-increasing amount of labor-saving, expensive equipment to a fuller capacity, he may elect to be a tenant with more land; whereas, if he elects to be an owner, he may enlarge his farming operations by becoming a part owner. Thus, for several Censuses, farms of both part owners and tenants have been increasing in

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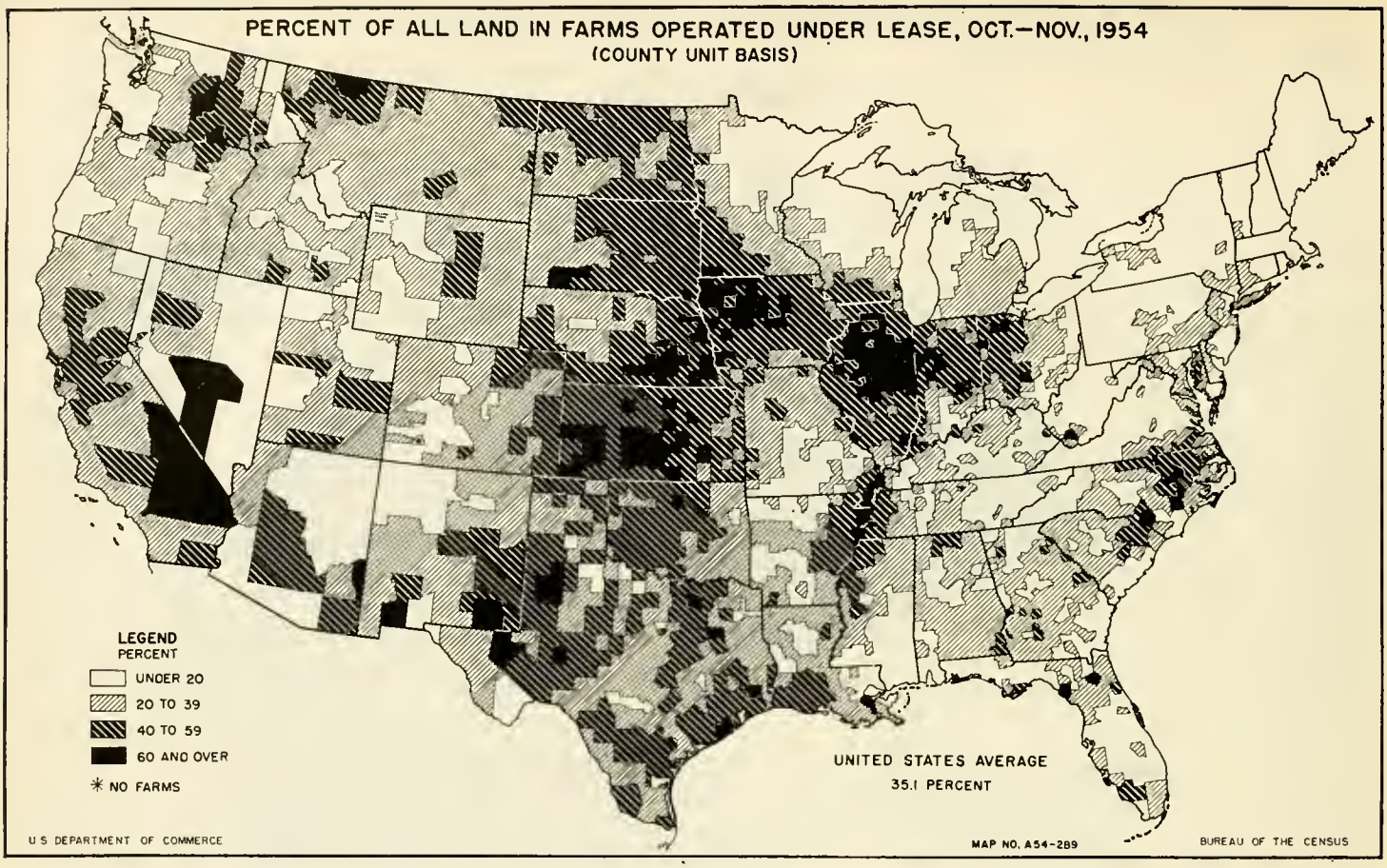


Figure 8.

Geographic distribution of leased land.—In general, there is a higher proportion of tenancy in areas of higher quality land. The Corn Belt, notably northwestern Iowa and northern Illinois, has a relatively high proportion of its farmlands under some form of tenancy. The same may be said of that part of the Great Plains engaged primarily in crop, rather than livestock, production. The lands in the Delta region of Arkansas and the Coastal Plains of the Carolinas also are rather heavily tenanted. An important exception are the range lands in the West which have a relatively low productivity per acre but yet are leased in large blocks for grazing purposes.

The value of land tends to be high in areas in which relatively large quantities of capital and labor per acre are required. If the financial resources of the farm operator are limited, he may choose to rent land in order to obtain a suitably large unit. Thus, the percentage of land under lease tends to be high where land values are high. The highest proportion of land leased, *43.7* percent, is found in the West North Central division; whereas, the lowest proportion of land under lease, *10.2* percent, is in New England.

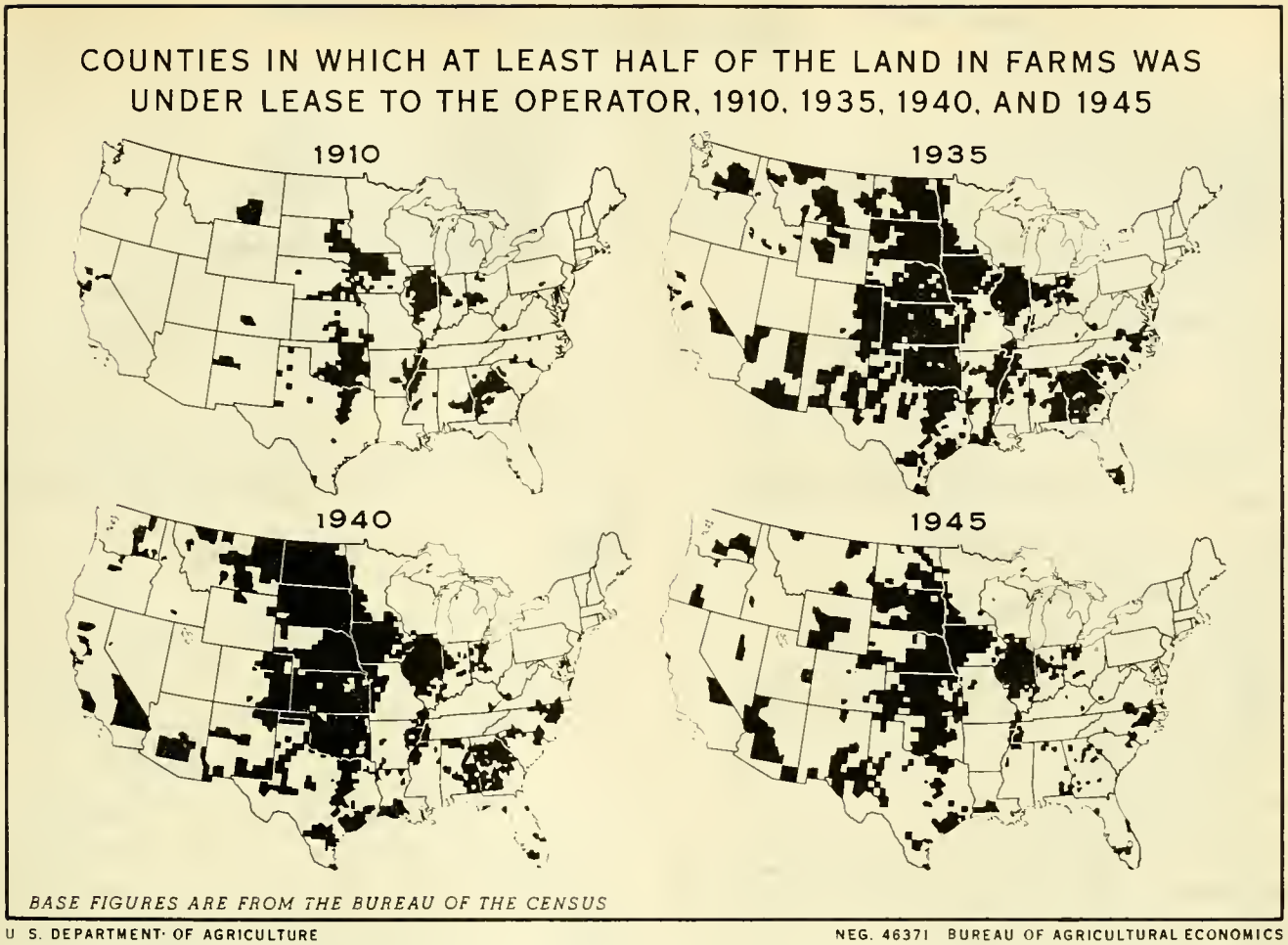
Although the percent of land under lease has declined from 44.7 in 1935 to 35.1 in 1954 for the country as a whole, not all areas have changed to the same degree. Since 1950, the South is the only region that has experienced a decline in the proportion of farmland rented; the three other regions have had slight increases.

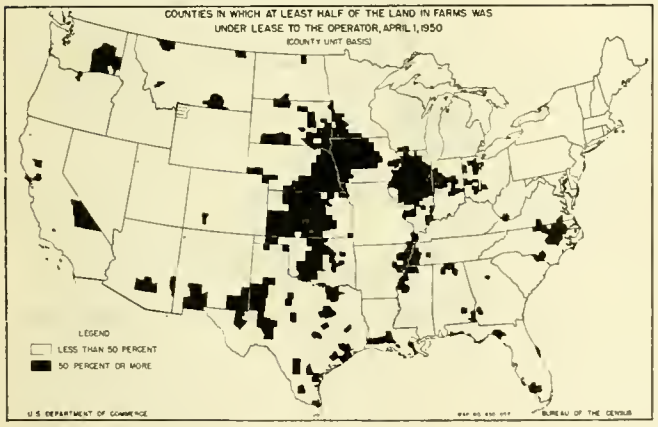
A tenure pattern which originated in one section of the country may be quite different from that which developed in another section. At the two extremes may be cited (1) the Pilgrims in Massachusetts who divided the land of the colony and established each family on its own farmstead, and (2) in several of the Southern States, large grants of land were made to companies and individuals who brought over indentured individuals for colonization. This was followed by the introduction of slave labor on plantations. After the Civil War, many planters without funds for hiring labor and laborers without management experience or lands joined forces in a landowner-sharecropper arrangement. This resulted in many small holdings in a tenant status.

Land ownership was made easier in some States where free or low-cost lands could be acquired for settlement. After settlement, alternating periods of high land values and economic depressions made it difficult for many beginners or tenants to become owners. In some areas droughts and other natural hazards caused a later out-movement of settlers who either maintained ownership or relinquished their rights to the land. This is to say that, through the years, the tenure pattern has been changing and at a different direction or rate of change as between States.

TABLE 3.—PERCENT OF ALL LAND IN FARMS OPERATED UNDER LEASE, FOR THE UNITED STATES AND GEOGRAPHIC DIVISIONS: 1930 to 1954

Area	1954	1950	1945	1940	1935	1930
United States	35.1	35.4	37.7	44.1	44.7	43.7
Northeast	14.5	13.8	14.4	17.2	18.0	17.2
North Central	42.2	42.1	46.1	51.6	50.5	48.9
South	32.5	34.5	35.4	41.8	43.9	42.7
West	31.9	31.1	33.6	40.9	43.1	42.4
Geographic Divisions						
New England	10.2	9.1	7.1	10.4	10.7	9.3
Middle Atlantic	16.1	15.6	17.5	20.0	21.2	20.4
East North Central	38.2	38.1	39.4	40.9	41.3	40.4
West North Central	43.7	43.8	48.9	56.0	53.7	52.4
South Atlantic	23.4	26.9	30.2	37.8	41.3	39.0
East South Central	26.5	30.2	31.6	38.1	40.1	39.2
West South Central	39.0	39.8	39.2	45.1	46.6	45.9
Mountain	30.7	30.2	33.5	41.2	44.5	43.8
Pacific	36.0	34.0	33.7	40.0	39.3	38.8





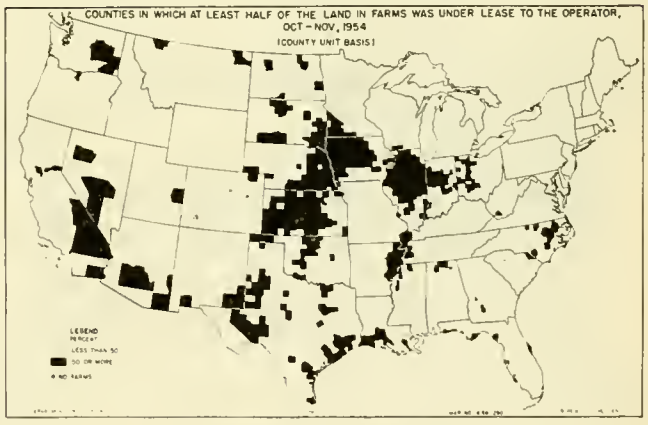


Figure 9.

Concentration of leased land.—The reduction in tenancy since 1935 can be seen in a general way by noting the increase in counties in which less than half of the land in farms is under lease. By 1910 the United States contained all its present States with the exception of Arizona and New Mexico, and yet commercial agriculture in many parts of the country was still maturing. In that year, 403 counties had over half their farmland under lease. As a benchmark, the year 1910 helps to indicate the increase of land under lease to a peak of 471 million acres in 1935 at which time 1,107 counties had at least half of their farmland under lease. Since 1935, the number of counties with over half the land under lease declined to 1,017 in 1940, 592 in 1945, and 510 in 1950. In 1954 there was 482 counties with one-half or more of their land under lease. Certain areas—notably the Mid-Plains, Corn Belt, and Arkansas–Mississippi Delta—continue to have a relatively heavy concentration of land under lease.

Since 1950, some slight shifts may be noted in the concentration of leased land. Most of the decrease in the number of counties with 50 percent or more of farmland under lease was in the South. Otherwise, the pattern of leased land concentration remained about the same in 1954 as in 1950, with slight changes accounted for by minor changes in the proportion of land which would move a county from the "less than half" to the "half or greater" category or vice versa.

NUMBER OF FARMS, BY TENURE OF OPERATOR, FOR THE UNITED STATES AND REGIONS, 1880–1954

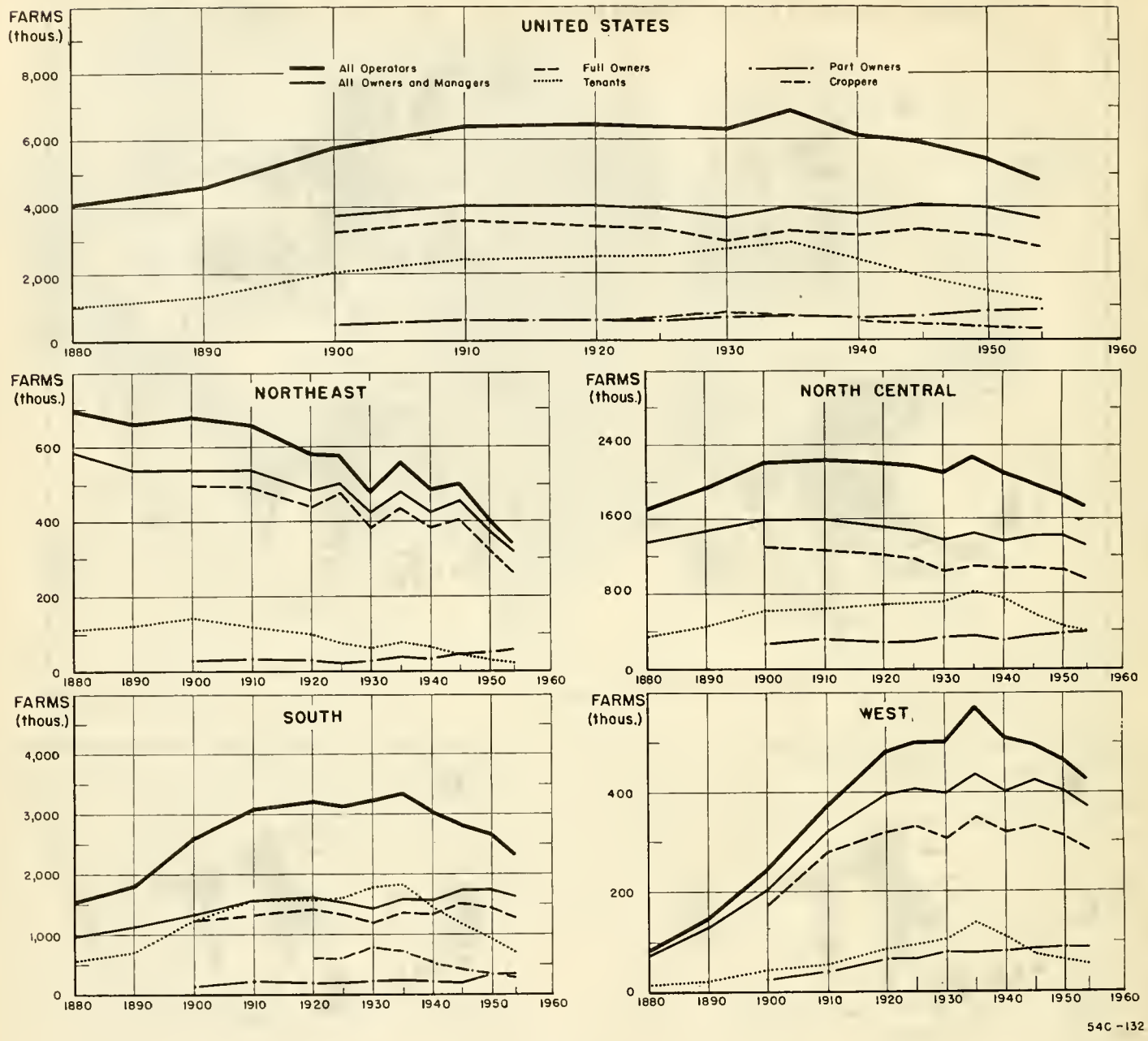


Figure 10.

TENURE OF FARMS

Changes in the number of farms.—In 1954, the number of farms in the Nation was nearly 600,000 below the number recorded in 1950. The 1954 total of approximately 4.8 million farms was also the lowest recorded at any Census since 1890, at which time there were about 4.6 million units. The 1954 number of farms also represented a drop of more than 2 million from the peak reached in 1935. The more restrictive definition of a farm used in 1950, and again in 1954, accounted for a small part of the decline in the number of farms for the last two Censuses as compared with earlier years. The change in definition in 1950 accounted for a drop of an estimated 150,000 to 170,000 farms between 1945 and 1950, most of which were owner-operated.

Changes in the tenure of farm operators.—In 1954, the Census reported 2,736,951 full owners, 856,933 part owners, 20,647 managers, and 1,167,885 tenants in the United States. The number of farms in every tenure category, except part owners, has decreased since 1950.

Regional comparisons show that, in varying degrees, the changes in tenure generally have been in the same direction throughout the country since the depression of the 1930's. The number of full owners, managers, and tenants is decreasing and the number of part owners is increasing slightly.

Operators who farm only land which they own represent 57.2 percent of all farm operators. The number of full owners in 1954—2,736,951—is the lowest since 1925, when this tenure was first classified separately.

From 1880 to 1930, both the number of tenants and the percentage of tenance increased continuously. Since 1930, the percentage of farms operated by tenants has shown successive decreases, although the highest number of tenants was not reached until 1935. Tenant-operated farms in 1954 were fewer than for

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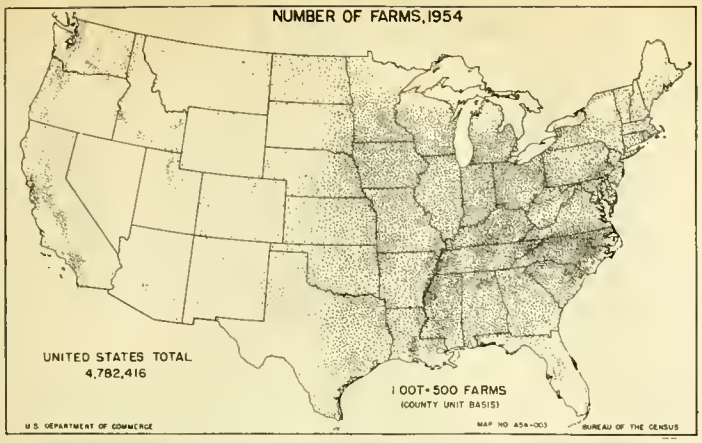
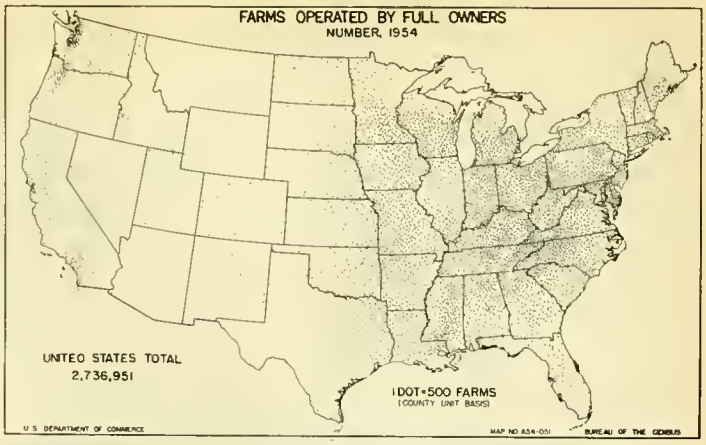
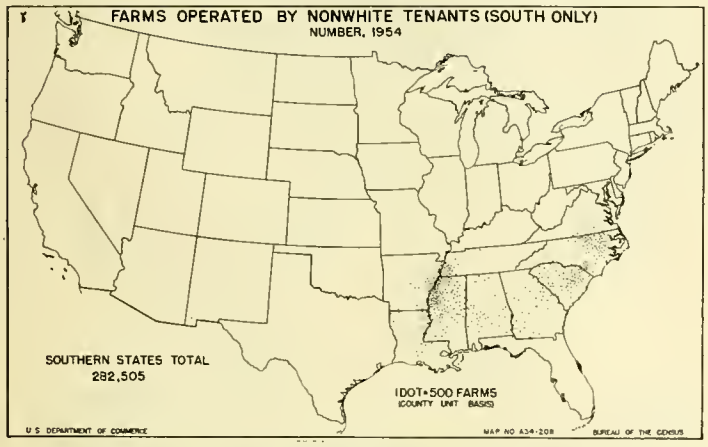
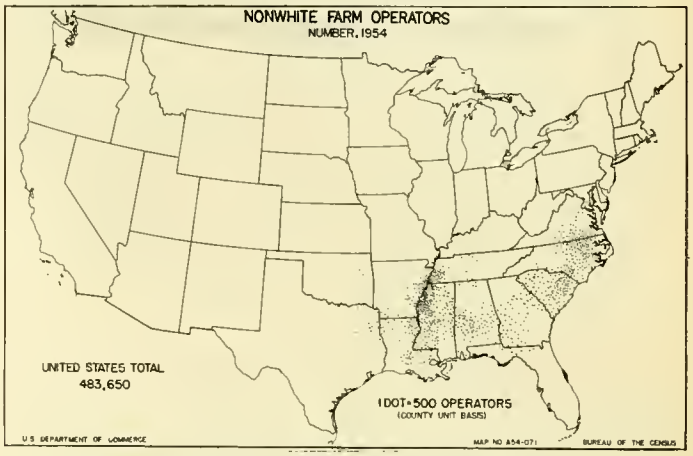
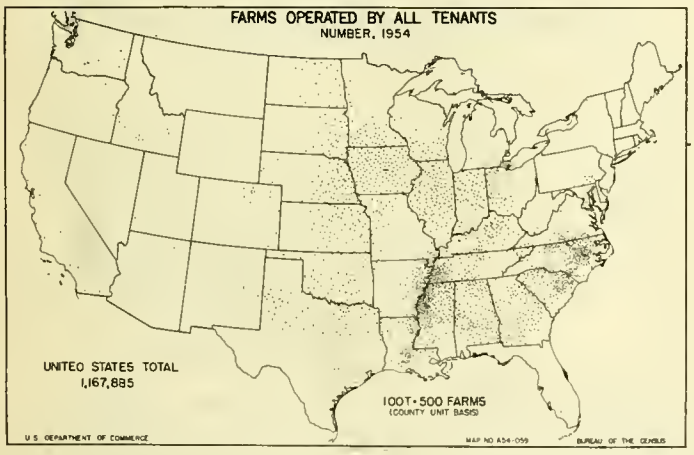










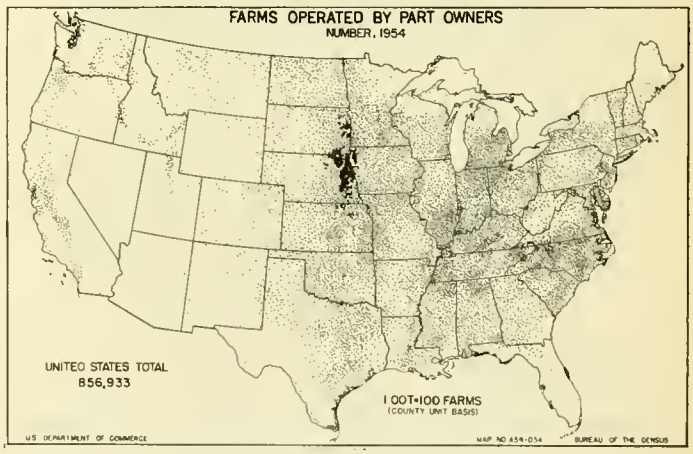


Figure 11.

Geographic distribution of tenure groups.—Tenants have not been so numerous in the Northeast and the West as in the South and in the North Central Region. More than one-half of all tenants are located in the South.

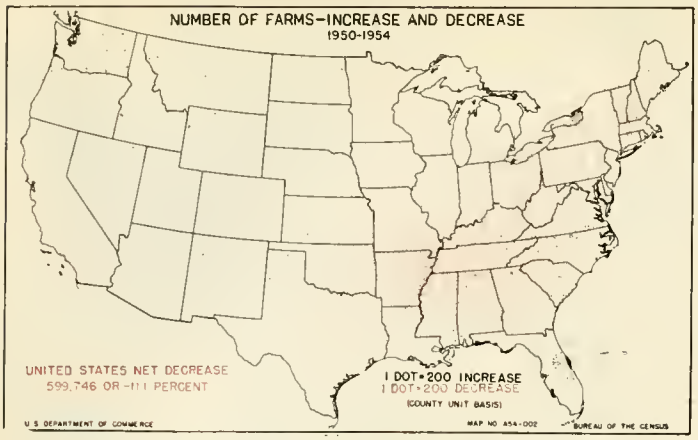
Tenant farms are most prevalent in cotton-and-tobacco growing areas. These predominantly southern-grown crops require a large amount of hand labor as measured in hours per acre. Such farms are usually small in total area. Tenant farms are also numerous in areas where the productivity of land is relatively high. Northern Illinois, northwestern Iowa, and the eastern part of the Great Plains are examples of such areas.

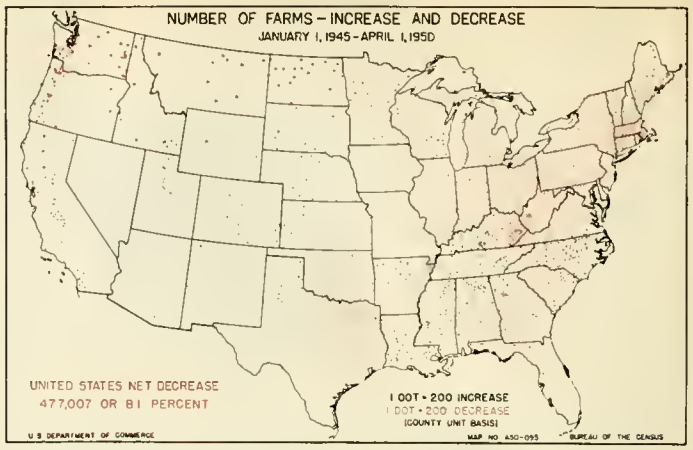
Part-owner farms, while showing a fairly uniform distribution, are more prevalent in the wheat- and corn-producing areas. Farm

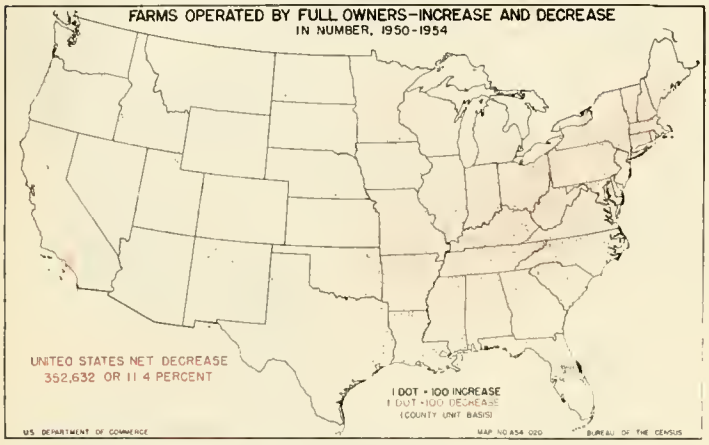
(*Continued on page 188*)

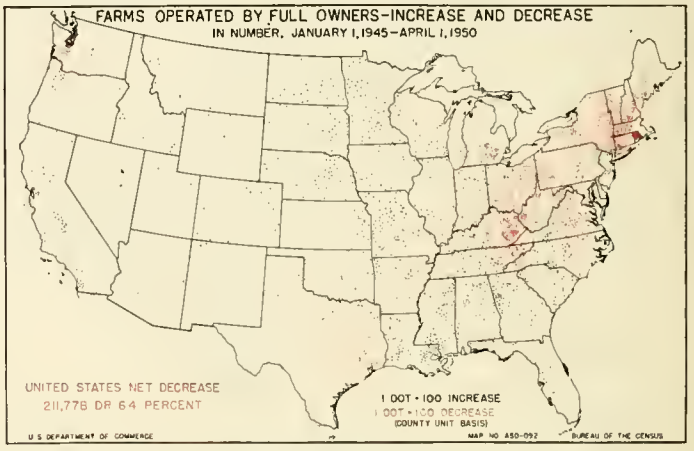
Color of farm operators.—The Census classifies farm operators as "white" or "nonwhite." Nonwhite includes Negroes, Indians, Chinese, Japanese, and all other nonwhite races. In 1954, there were 483,650 nonwhite farm operators in the United States. Of these, 465,216, or 96.2 percent, were in the South where the nonwhite farm operators are predominantly Negro. In the West, most of the nonwhite farm operators are Indians. In the South, nonwhite operators are concentrated in the Coastal Plains and in the Mississippi Delta. There was a loss of 97,269 in the number of nonwhite operators between 1950 and 1954 for the country as a whole and 93,874 for the South. The percentage of farm tenancy among nonwhite operators dropped from 64.0 in 1950 to *59.6* in 1954 for the United States and from 65.4 to *61.0* percent for the South during the same period.

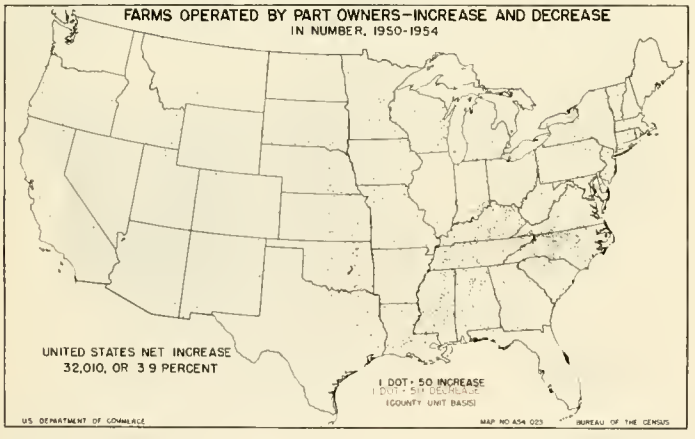
COMPARISON OF CHANGES IN NUMBER OF FARMS, BY TENURE OF OPERATOR, FOR THE UNITED STATES 1945–1950 AND 1950–1954

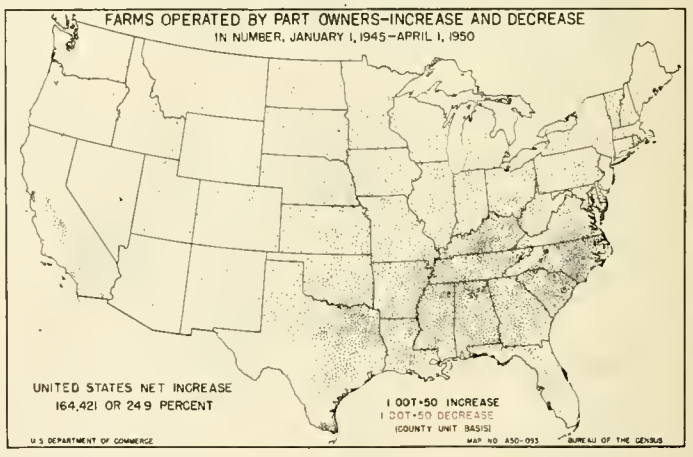


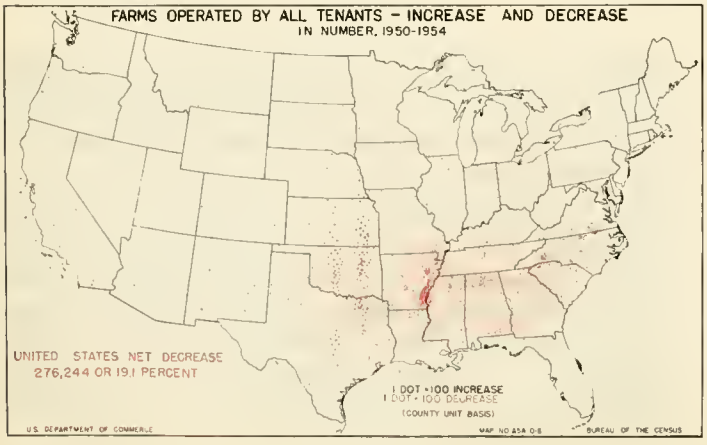












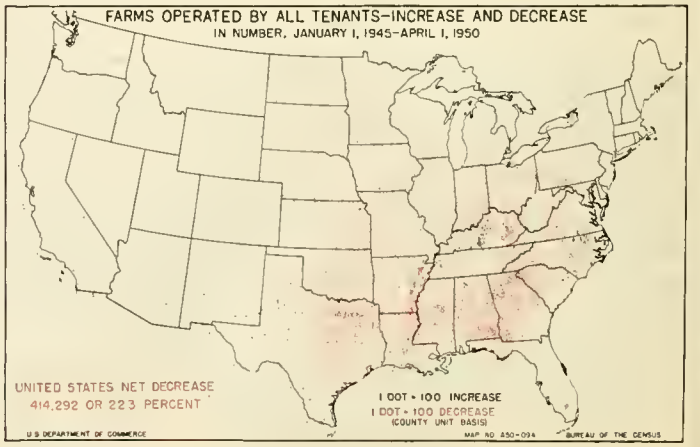
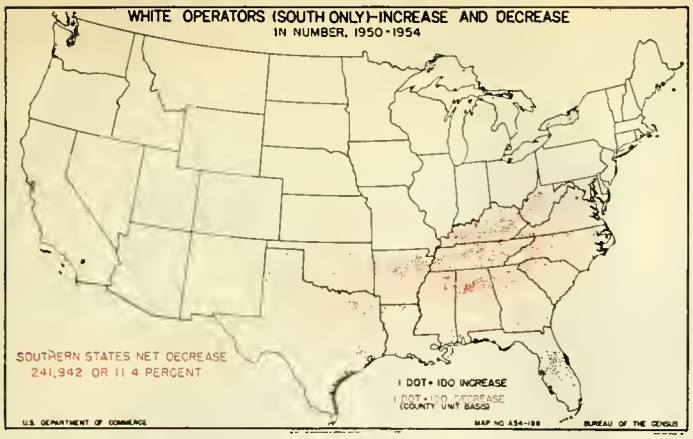
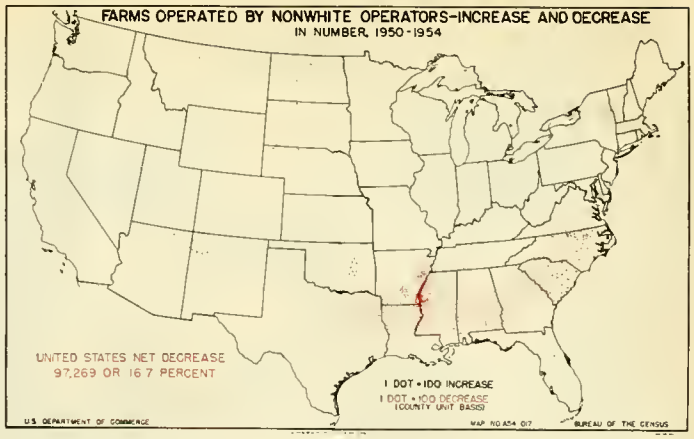
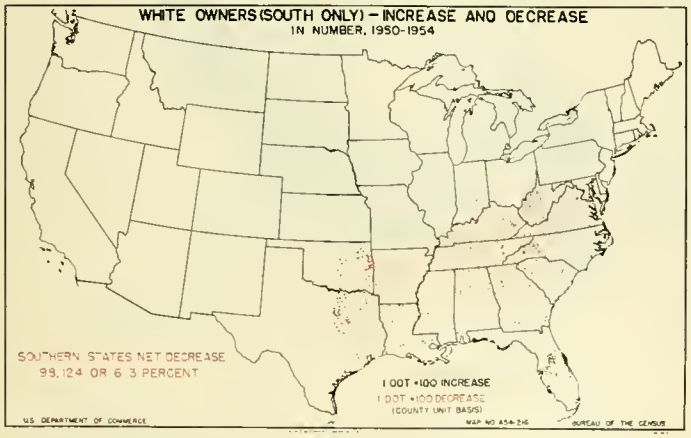


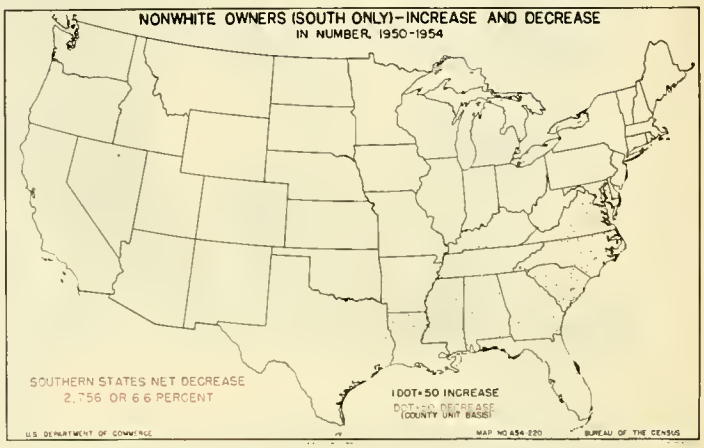
Figure 12.

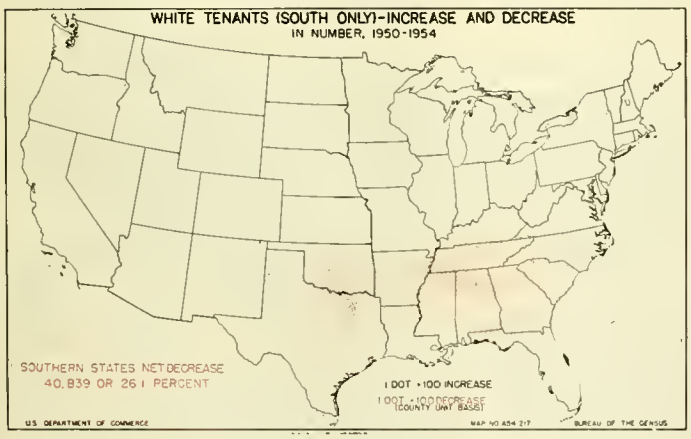
CHANGES IN NUMBER OF FARMS, BY COLOR AND TENURE OF OPERATOR, FOR THE SOUTH: 1950–1954

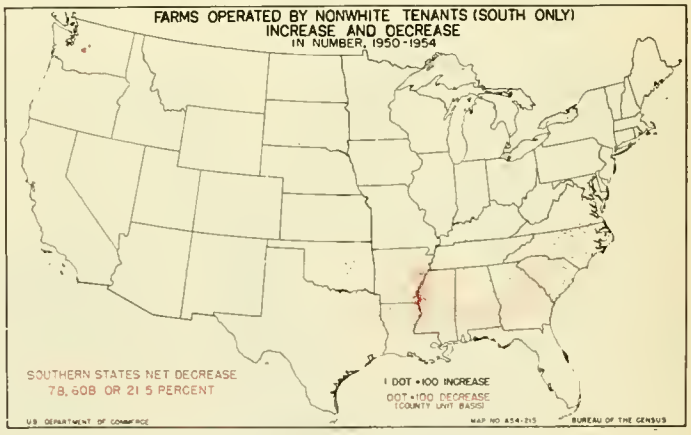


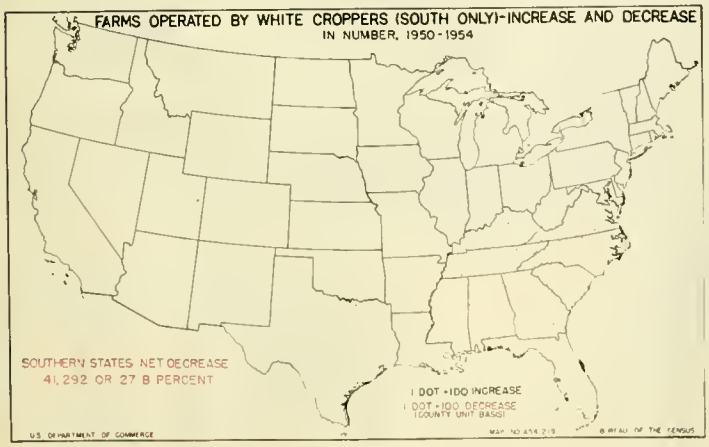












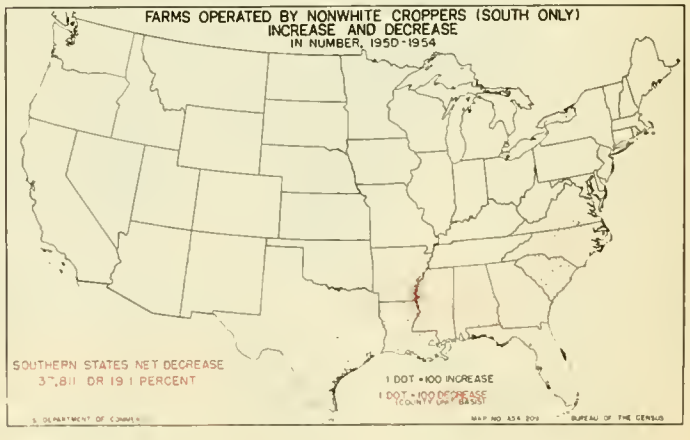


Figure 13.

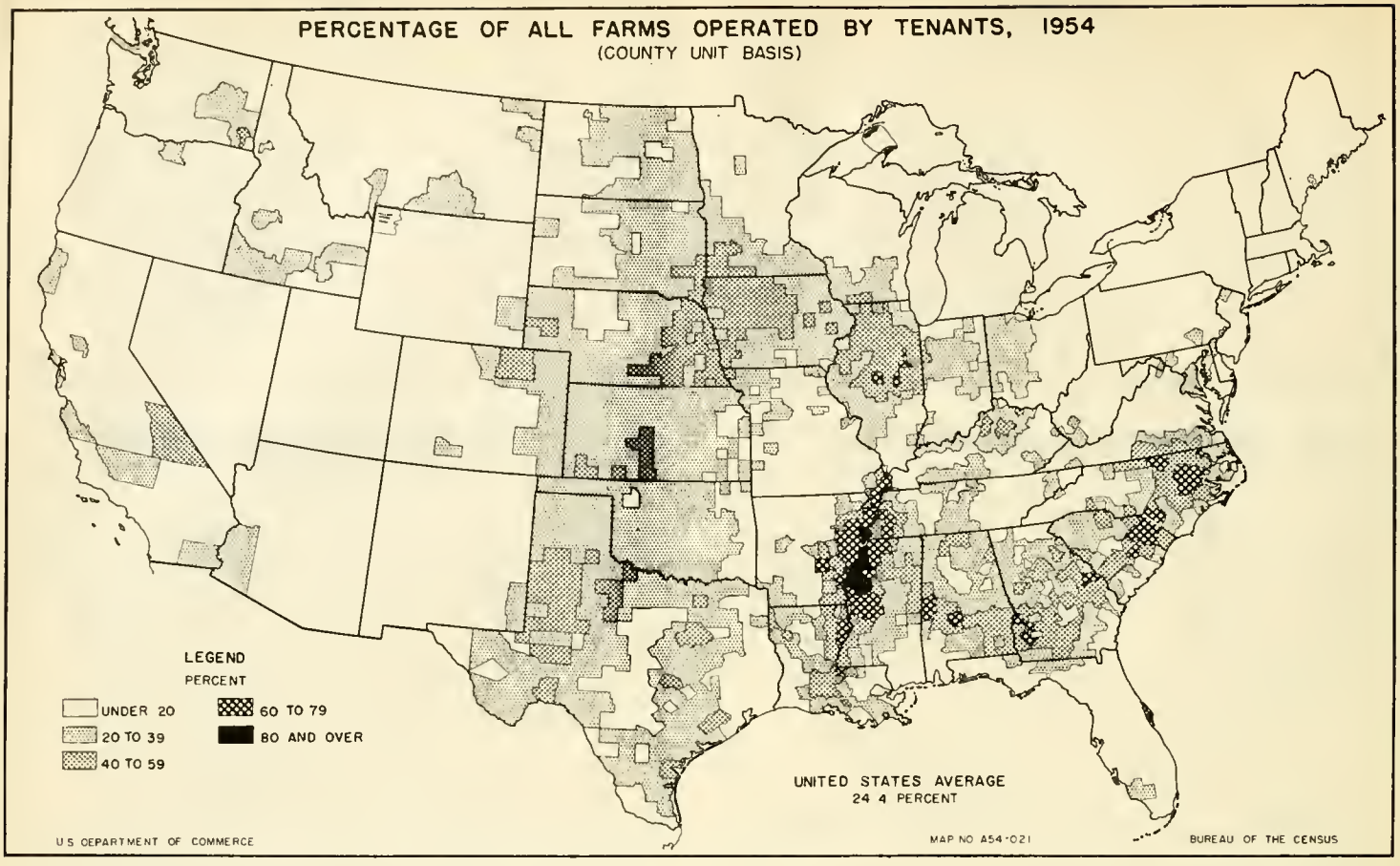


Figure 14.

Farm tenancy.—No agricultural Census since 1880 has reported as few tenants as the 1,167,885 reported in 1954; this number is 1.7 million less than the peak number in 1935. Operators who own none of the land they cultivate represented, in 1954, a smaller proportion of all farm operators than at any time in the history of the Nation. However, one-fourth of the farms and one-fourth of the cropland are still farmed by tenants.

One of the important features of tenancy in agricultural production is that owners of resources (land, capital, and labor) may combine these resources without the necessity of a permanent transfer. Tenancy is a means for a skilled manager to operate a farm even with limited capital and land. Conversely, it is a convenient arrangement for the owner of resources who cannot, or prefers not to, participate in the actual farming operation. Tenancy has frequently been viewed as part of the course toward ownership through successive steps of farm laborer, tenant, part owner, owner operator, and landlord. It is recognized, however, that several of these rungs of the so-called agricultural ladder might be bypassed. Census data indicate that many tenants become owners. In 1954, *70.5* percent of the farm operators under 25 years of age were tenants, whereas only *9.3* percent of the operators 65 years or older were tenants. The percentage of tenants was consistently lower as the age of the operator increased.

The concentration of tenant farms, while traditionally great in the South, has made certain notable shifts since Census data became available. One of the principal reasons for the relatively large number of tenant farms in the South was the sharecropping system and its association with cotton and tobacco. Since many of these tenant farms in the South are very small, they account for a higher proportion of the farms than the land in farms.

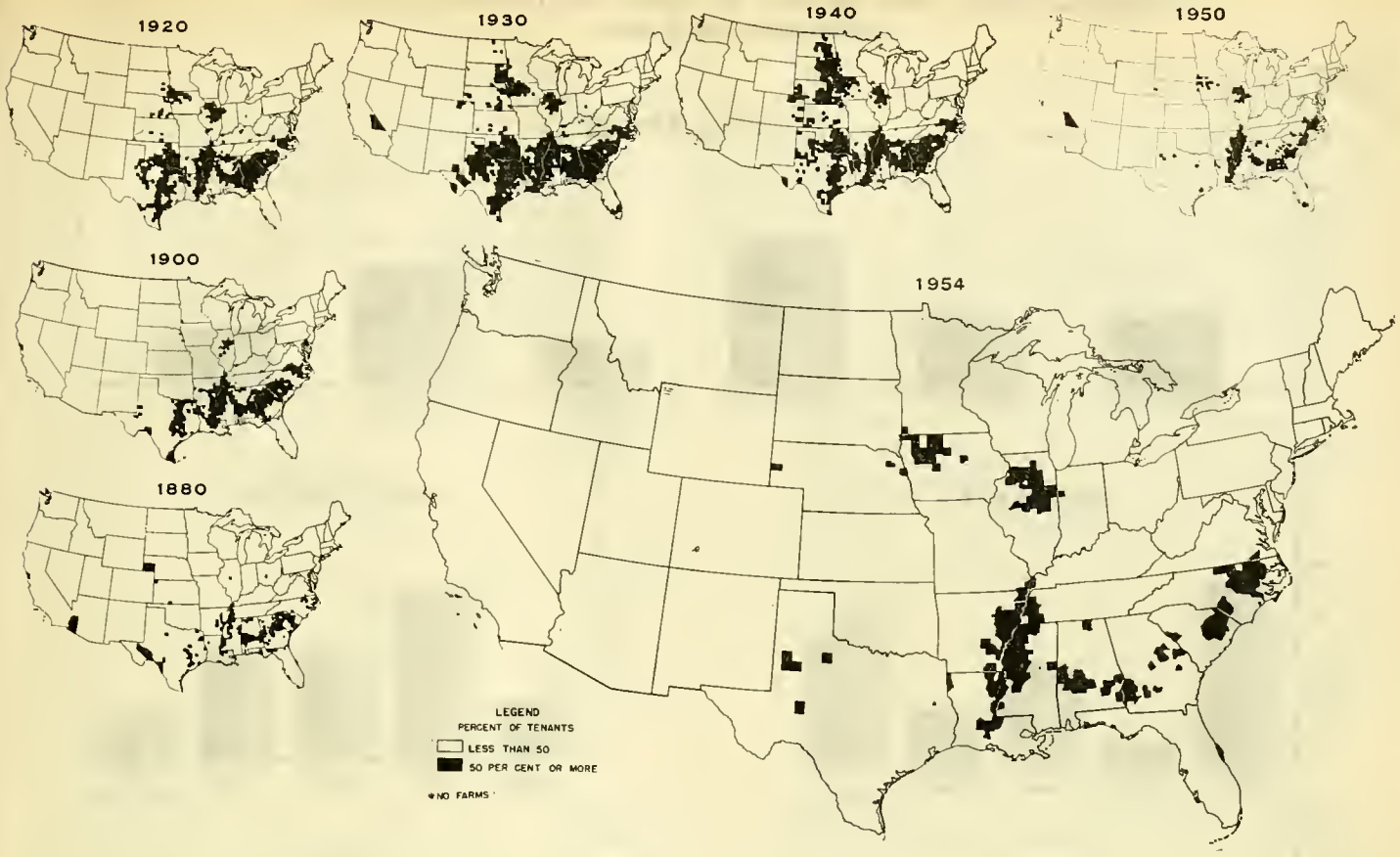
In the Plains there is a heavier concentration of land under lease than of the number of tenant farms because of the large acreages operated by tenants and the large leased acreages of part owners. In the high risk Plains area the number of counties in which at least half of the farms are operated by tenants has varied from Census to Census. The Corn Belt has had a relatively heavy concentration of both number of tenant farms and rented land in farms ever since shortly after the beginning of this century.

Considerable variation exists in the method of leasing as between different areas and types of farming. Croppers, of course, are reported only in the South. Crop-share rent is found in varying degrees throughout the country, and is common on commercial farms. Crop-share arrangements may also be combined with a fixed cash rental—for example, for buildings, pasture, or hayland—to form the share-cash combination frequently reported by operators in the Eastern Great Plains and Corn Belt. Cash leasing is used less frequently than the other methods of rental except for livestock-share. It is important in many of the grazing areas of the West, in the South, and in New England.

TABLE 4.—PERCENT OF ALL FARMS OPERATED BY TENANTS, FOR THE UNITED STATES AND REGIONS: 1880 TO 1954

Year	United States	North-east	North Central	South	West
1954	24.0	6.0	23.3	29.4	12.1
1950	26.8	6.8	24.2	34.1	12.9
1945	31.7	8.6	29.1	40.4	14.5
1940	38.7	12.6	35.4	48.2	21.3
1935	42.1	13.8	36.3	53.5	23.8
1930	42.4	12.5	34.1	55.5	20.9
1925	38.6	13.0	32.0	51.1	18.7
1920	38.1	17.2	31.1	49.6	17.7
1910	37.0	18.2	28.9	49.6	14.0
1900	35.3	20.8	27.9	47.0	16.6
1890	28.4	18.4	23.4	38.5	12.1
1880	25.6	16.0	20.5	36.2	14.0

COUNTIES IN WHICH AT LEAST HALF OF THE FARMS WERE OPERATED BY TENANTS 1880, 1900, 1920, 1930, 1940, 1950, AND 1954



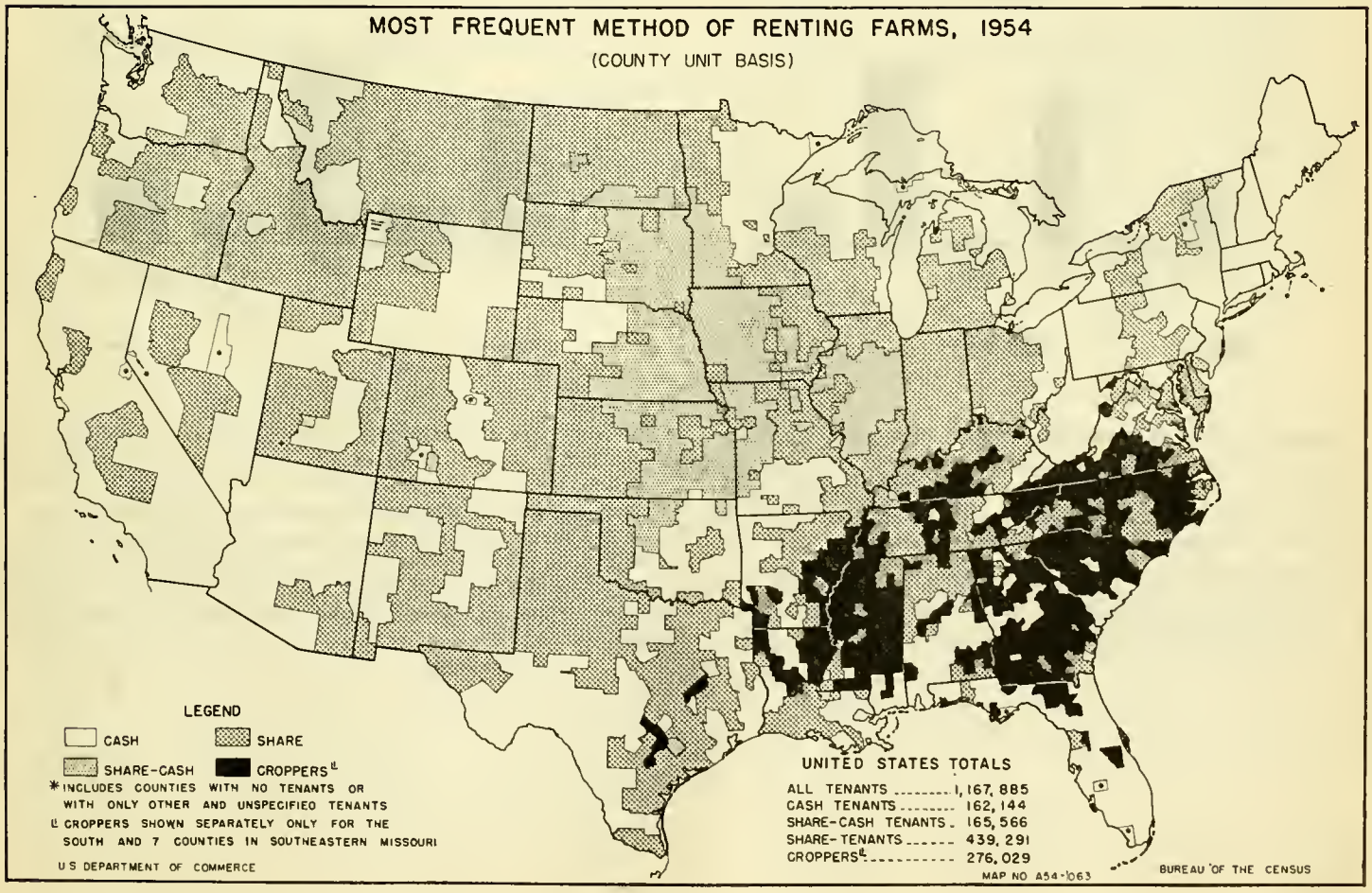


Figure 15.

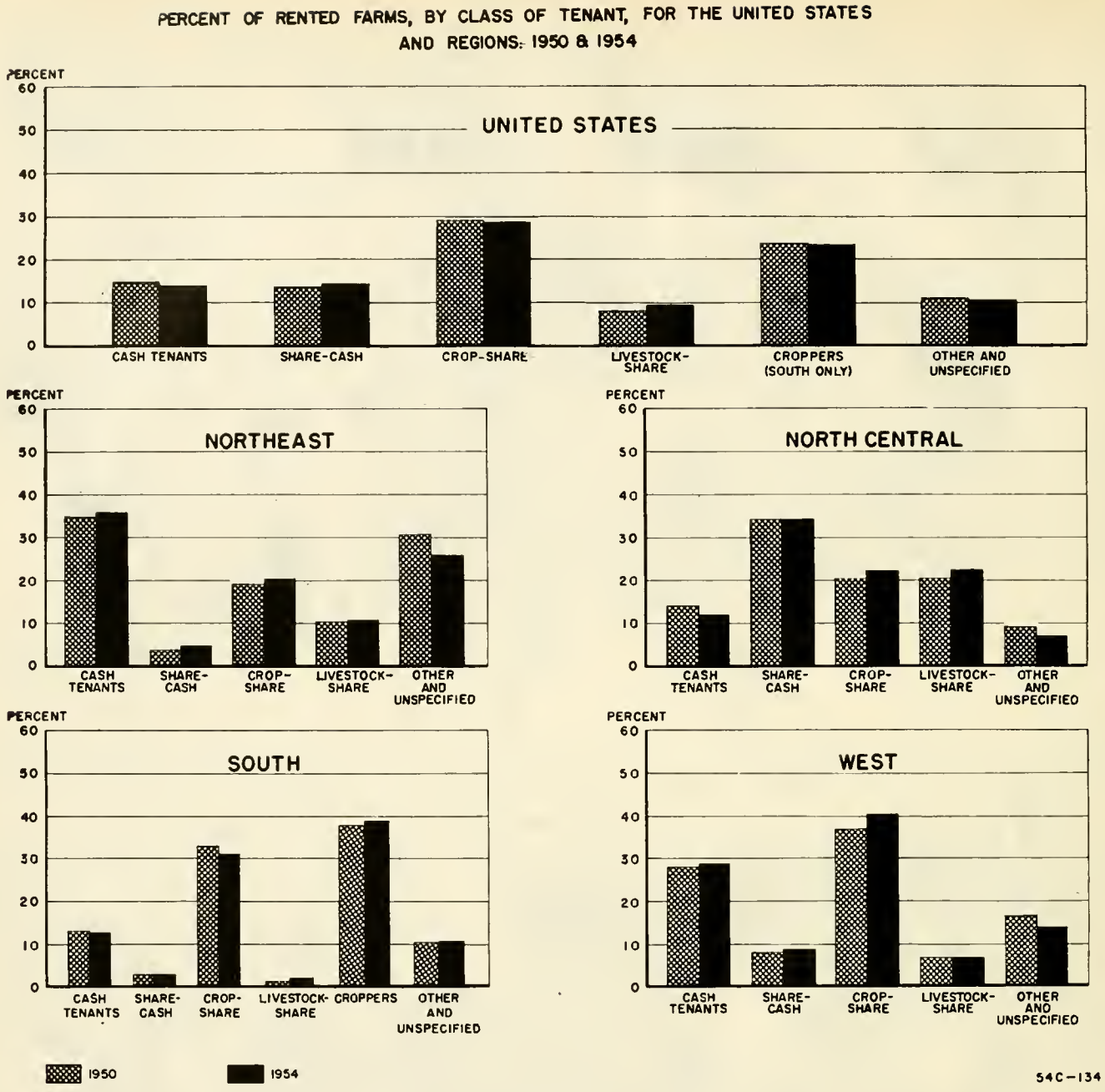
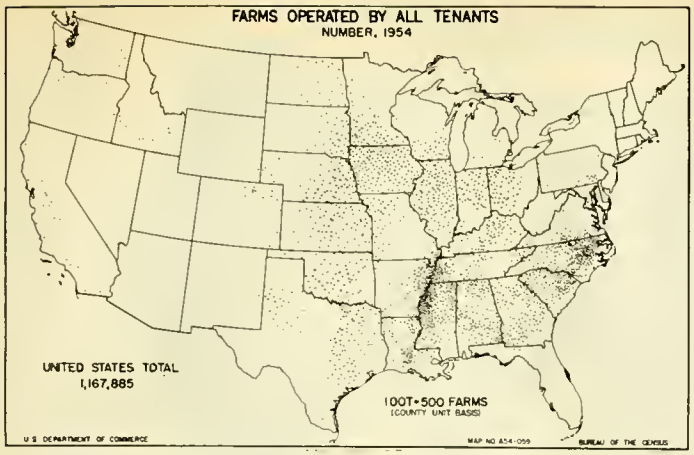
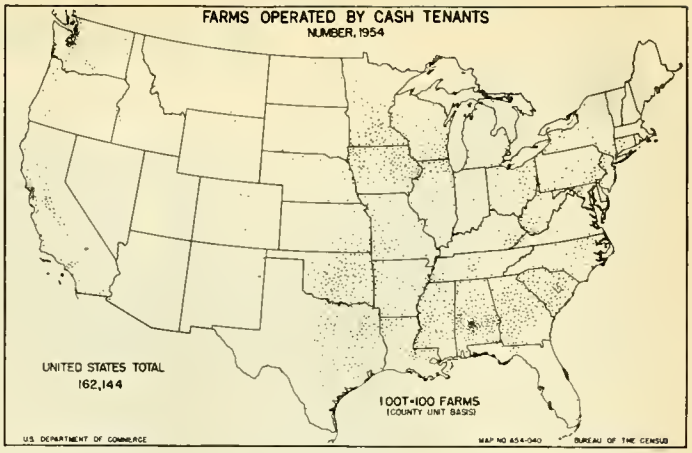


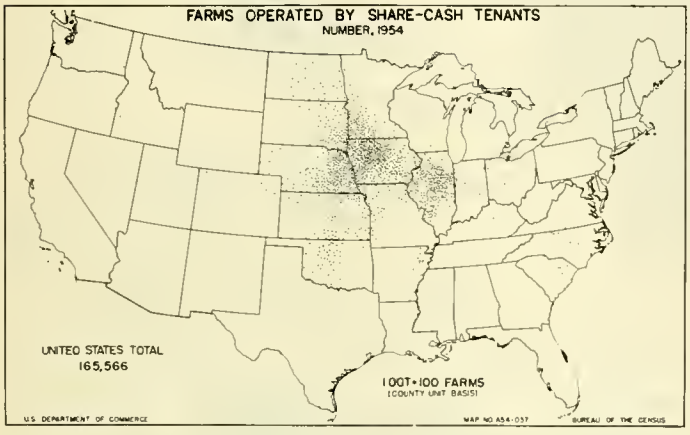
Figure 16.

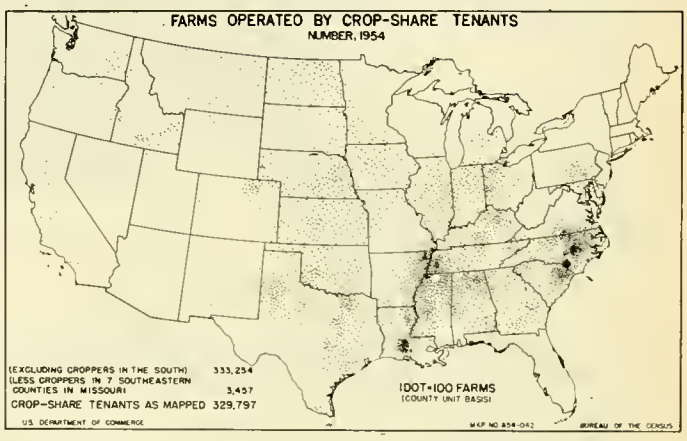
Changes in class of tenant by regions.—Most tenancy arrangements require rental payment in the form of a share of the crops or livestock. For the country as a whole, a slight increase in the proportion of livestock-share leases and a slight decrease in the proportion of cash leases were reported between 1950 and 1954.

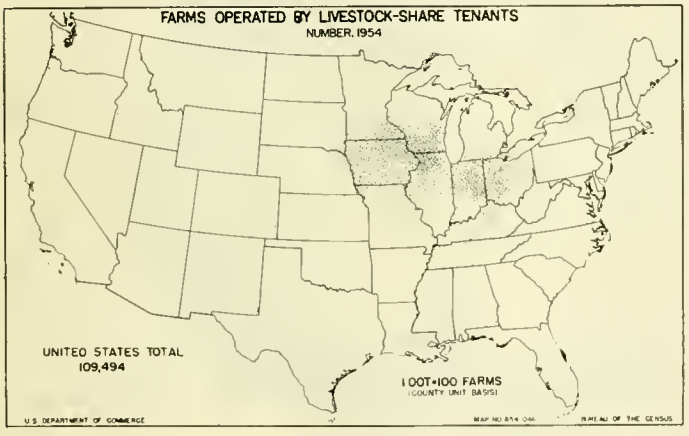
In 1954, 162,144, or 3.4 percent of all farm operators, were cash tenants and 165,566, or 3.5 percent, were share-cash tenants. In share-cash arrangements the principal market crop is frequently under a crop-share rental. Crop-share leases were used on 333,254, or 6.9 percent of all farms, and livestock-share arrangements were reported on 109,494, or 2.3 percent of all farms. Sharecroppers numbered 272,572 and accounted for 5.6 percent of all farms. Sharecroppers represented 23.3 percent of all tenants in 1954, a position not greatly different from the one they occupied in 1920 when this group was first separately classified and at which time they comprised 22.9 percent of all tenants.











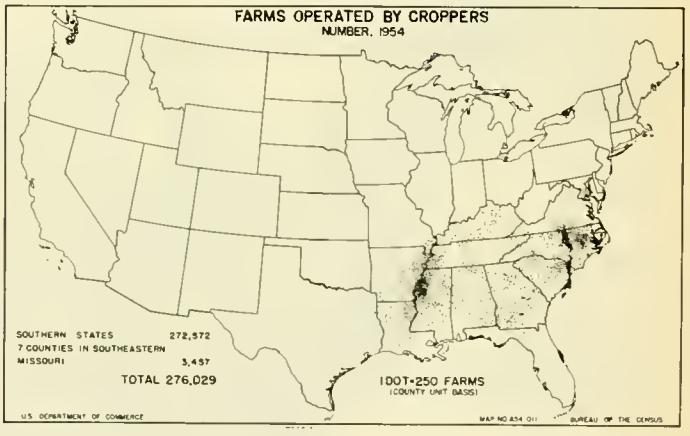


Figure 17.

The number of tenant farms.—With some exceptions, the principal areas of concentration of tenants, as might be expected, follow the areas of concentration of all farms; for example, the Great Lakes Region, the Piedmont, and New England. In terms of change, however, it may be noted that, whereas the proportion of all farms operated by tenants in the United States as a whole dropped from 26.8 percent in 1950 to 24.4 percent in 1954, the South showed a greater decline, from 34.1 percent to 30.1 percent.

Particular types of rental arrangements are associated with certain areas. These variations can be accounted for, partially at least, by differences in type of farming, climate, technology, population type and concentration, and economic conditions.

Crop-share rentals are found in their various forms in many parts of the country. A very high proportion of the leasing of farms growing tobacco is on a share basis. Crop-share rentals are also found with relatively high frequency in the Mississippi Delta area and in the rice-producing portions of Louisiana and Texas. Both ends of the Great Plains—North Dakota and Texas—employ the crop-share lease to a relatively large extent.

Livestock-share leases are almost exclusively in the Corn Belt and adjacent States such as Kentucky and Nebraska.

Cash leases are used most frequently for part-time or residential farms, for grazing land, and for crops with relatively stable yield patterns or in areas where production contains less risk and uncertainty. Consequently, they are used principally in the South, the Corn Belt, eastern Plains, New England States, and the States along the Pacific Coast.

Croppers, of course, are reported only in the South. This particular class of tenant is associated with the cotton and tobacco culture both of which traditionally required intensive cultivation. In the 1950-54 period, the number of croppers declined about 21 percent.

VALUE OF LAND AND BUILDINGS, BY TENURE OF OPERATOR, FOR THE UNITED STATES AND REGIONS: 1900-1954

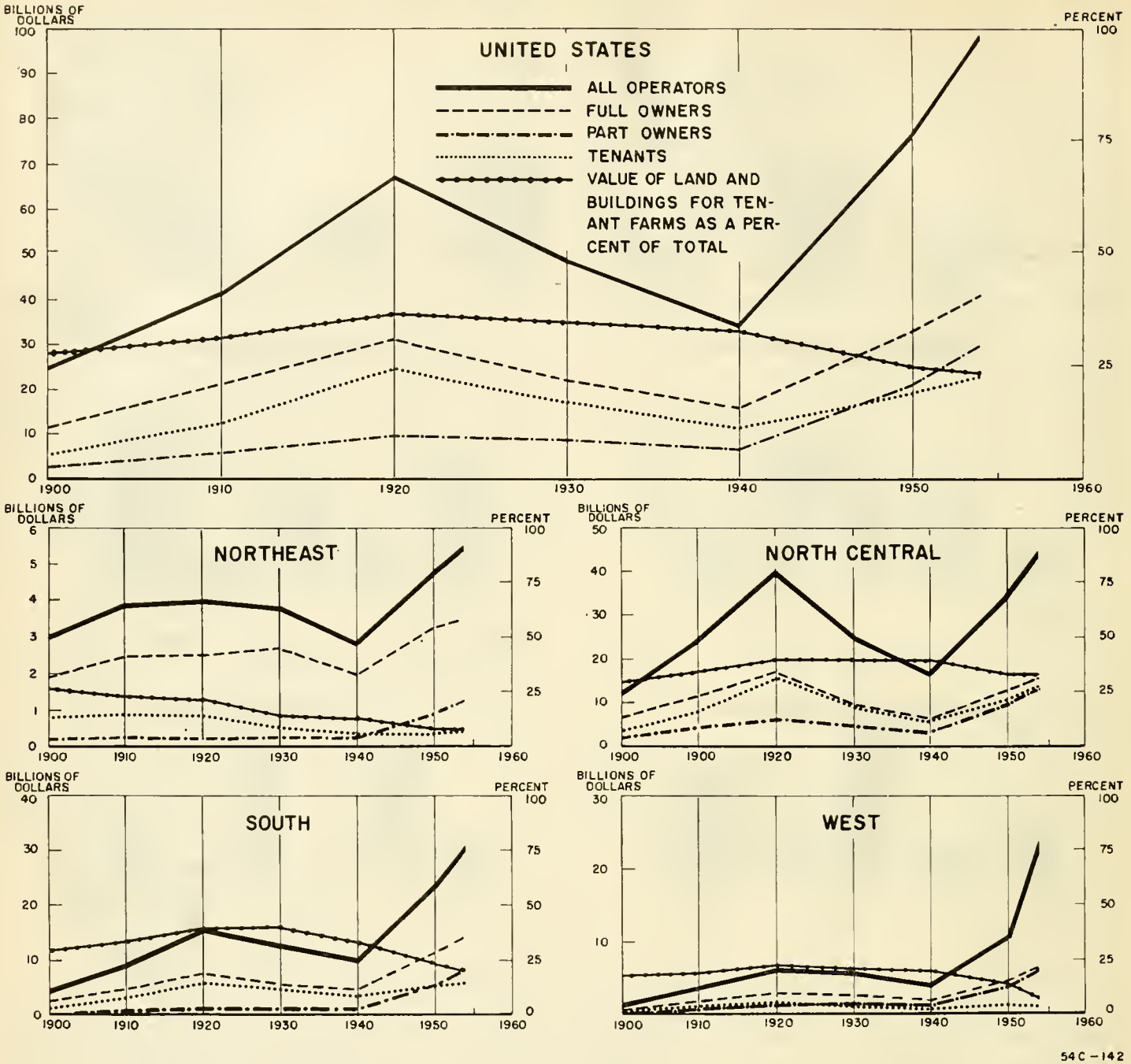
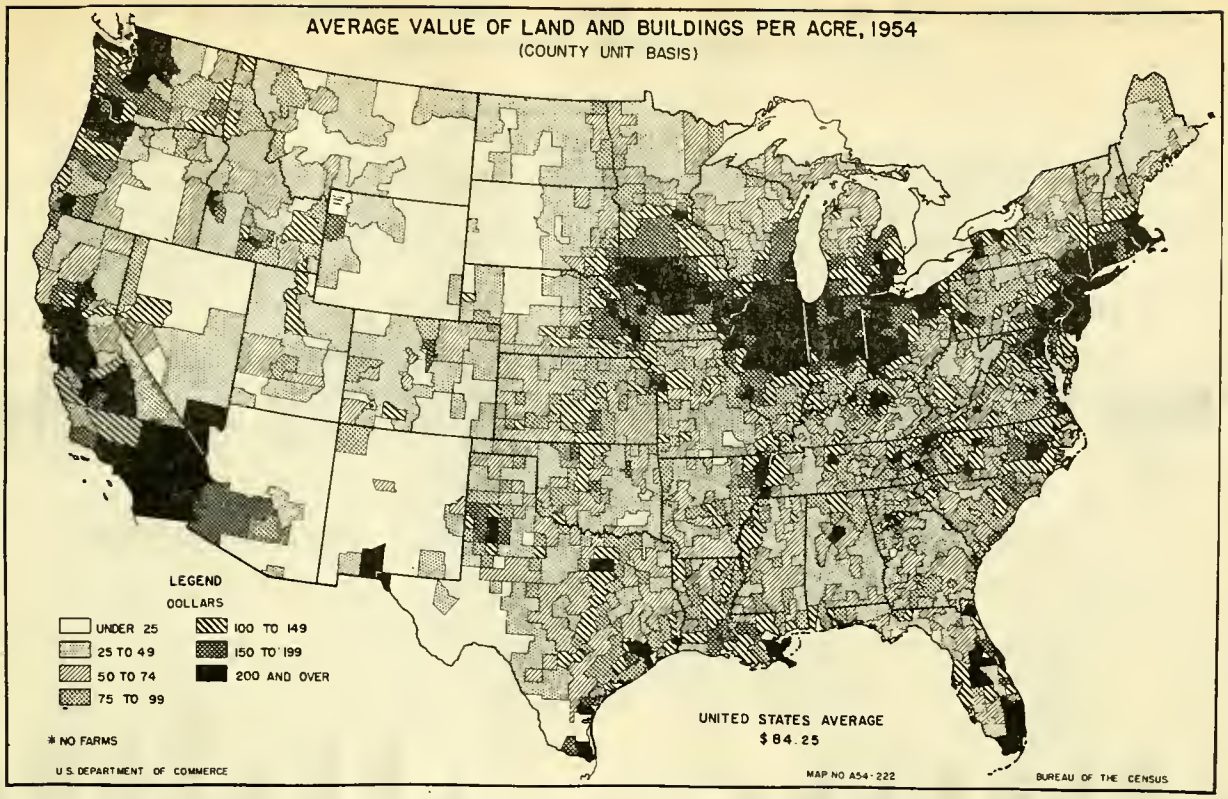


Figure 18.

VALUE OF LAND AND BUILDINGS

Total value of farm real estate.—The total value of land and buildings in 1954 was *97.6* billion dollars, almost a six-fold increase over the value reported in 1900. The long-run trend is an increase in land values, with a cyclical peak in 1920 followed by a decline which continued through 1935. Land values of all farms, regardless of tenure of operator, increased since 1940, but full owners showed a more rapid increase than tenants. The data reveal that full owners continue to control the greatest amount of land and buildings, as measured by value. The proportion of the total value of land and buildings represented by farms operated by tenants has decreased since 1920 with a more pronounced decrease since 1940. The general decline in the proportion of the value of land and buildings controlled by tenants reflects, to an extent, the decrease in the proportion of farms operated by tenants. The proportion of land in farms operated by tenants is also on the decrease, having dropped from 29.4 in 1940 to 16.6 in 1954.

In 1954, for the Nation as a whole, and for all regions except the North Central, the total value of farm real estate operated by part owners was greater than that operated by tenants. However, recent trends indicate an increasing importance of farm real estate operated by part owners in the North Central Region.



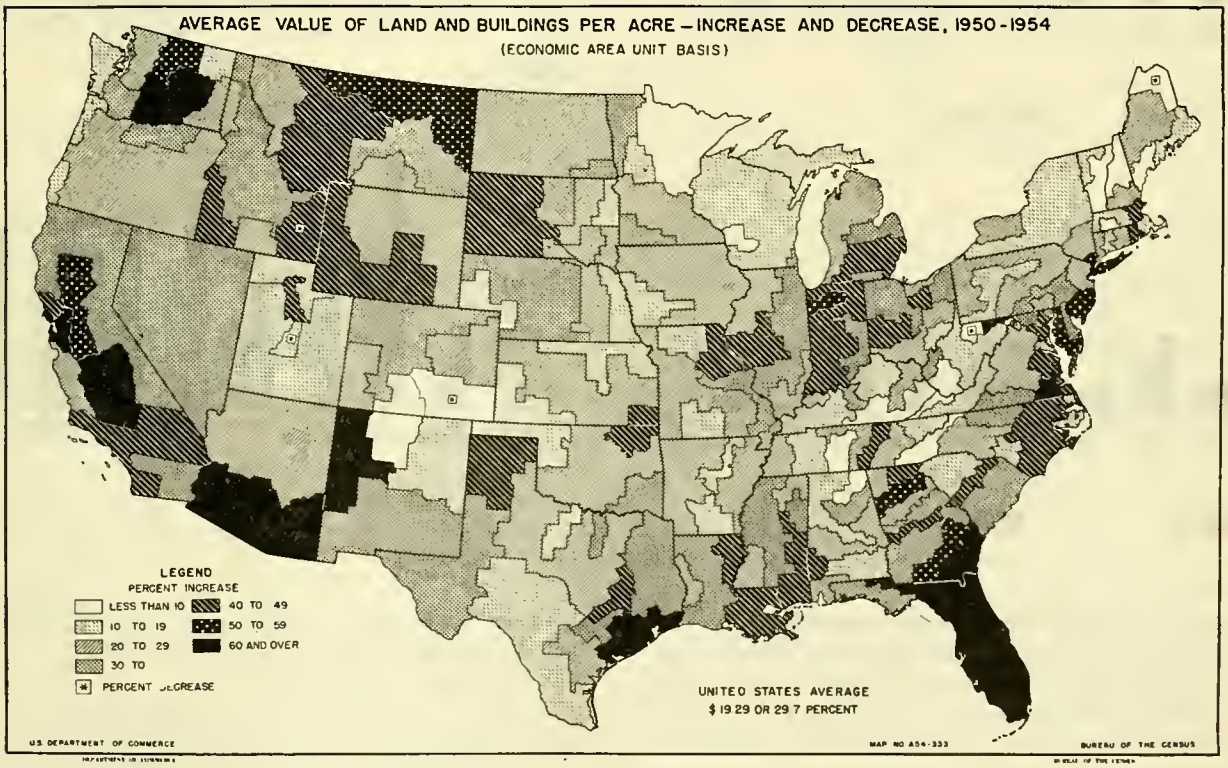


Figure 19.

Per acre values of farm real estate.—The highest per-acre values of farmland and buildings, except for isolated cases, were reported in the more urbanized areas of the Northeast, the more productive locations of the Corn Belt area, and the irrigated and crop-specialty areas of the Far West. In most of these areas of higher land values, particularly the Corn Belt, there is a greater concentration in the proportion of farmlands operated by full tenants.

Changes in the value of farm real estate: 1950–1954.—From 1950 to 1954 the average per-acre value of land and buildings in the United States increased 29.7 percent. The greatest percentage increases were in the areas with low land values; and, conversely, the smallest increases were in the areas with high values. The most drastics changes (50 percent and over) since 1950 took place in the Columbia River Basin, Central Valley of California, southeast Texas, southern Arizona, and Florida.

AVERAGE VALUE OF LAND AND BUILDINGS PER FARM, BY TENURE OF OPERATOR, FOR THE UNITED STATES AND REGIONS: 1954 AND 1950

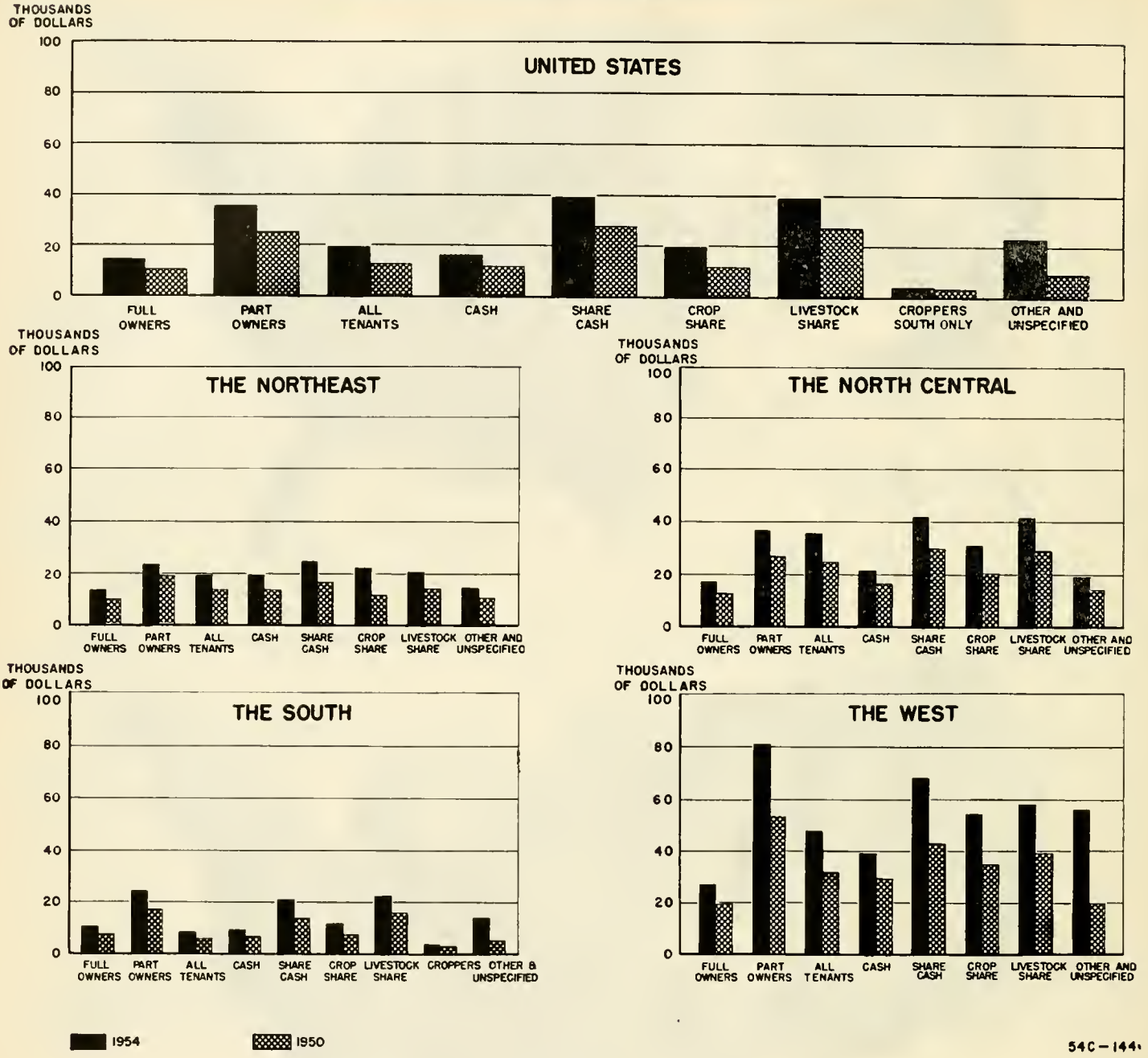


Figure 20.

Average value of land and buildings per farm.—Ordinarily the more productive lands are more attractive to tenancy, and farms under tenant operators (sharecroppers excepted) are larger than those under owner operators. Consequently, the value of land and buildings per farm reported for tenants was higher than that for owners. Part-owner farms showed higher per farm values than either full owners or tenants.

Farms under share-cash and livestock-share leases continued to show (compared with 1950) the highest per-farm values for fully rented farms for the United States as a whole and for all the regions except the Northeast. The pattern of average values by tenure of operator is quite similar to that for 1950, except that the values under share leases have increased slightly more than those under cash leases.

The high value of land and buildings per commercial farm for part owners is due to large size rather than high value per acre. The relatively high value of commercial farms operated by share-cash and livestock-share tenants, however, appears to be due to both large size and a high value per acre compared with lands of other tenure groups. The increases in per-farm values reported in 1954 over those reported in 1950 were most pronounced on part-owner, share-cash, crop-share, livestock-share, and unspecified tenant farms.

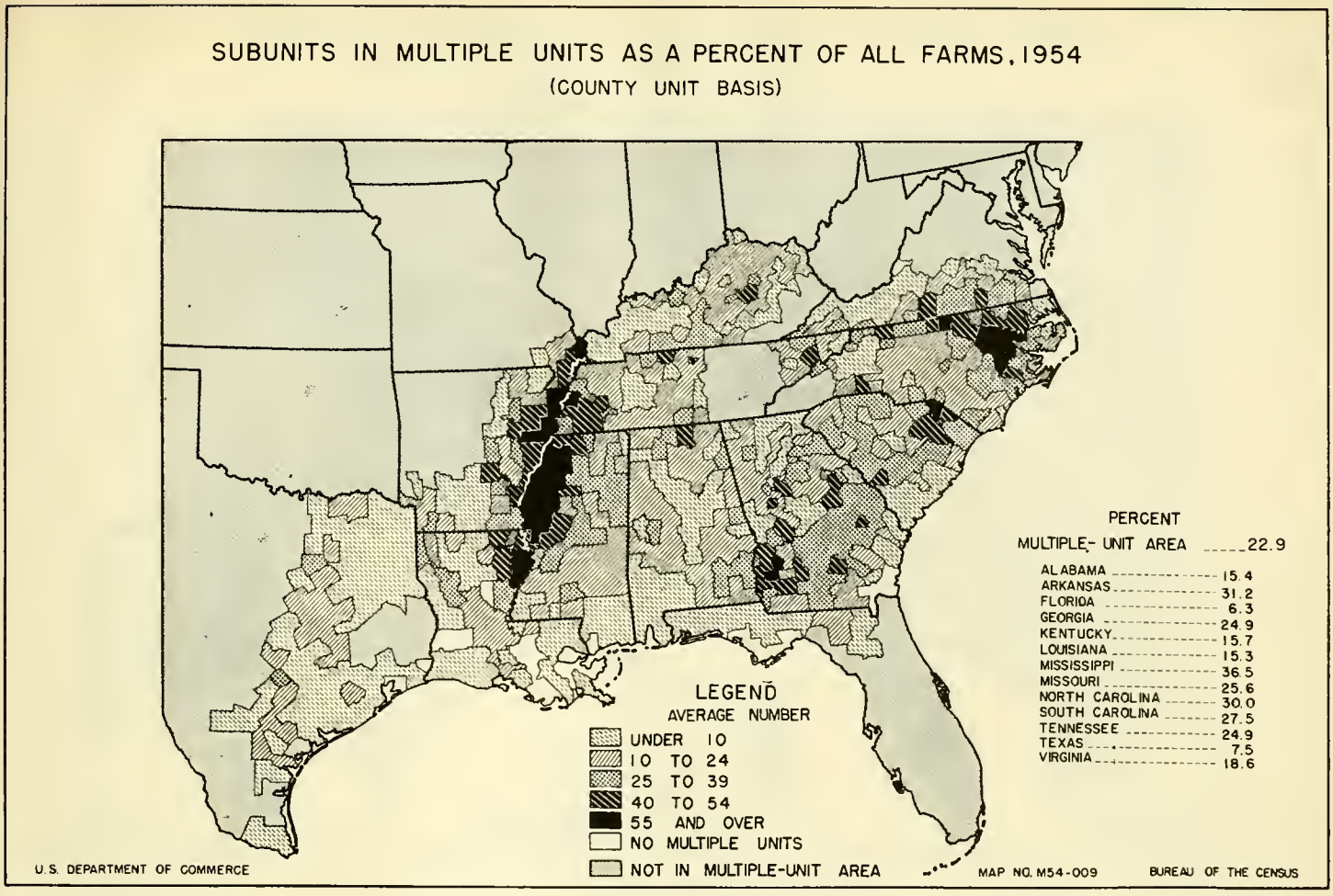


Figure 21.

MULTIPLE-UNIT OPERATIONS

The nature of multiple units.—A classification as broad as that set up by the Census Bureau definition of a farm necessarily includes many different types of agricultural units. Some of these types, because of their distinctive characteristics, are given separate treatment in the Census reports. Multiple-unit operations comprise one such special class.

Many landholdings, particularly in the Southern States, contain several farms, as farms are defined by the Census Bureau, but in reality these farms belong to one landlord, and in many instances they are managed as a single farm business unit. The listing of these farms only as individual farms gives an incomplete picture of the actual nature of farming in these areas and, for this reason, it has been considered desirable to present statistics for the overall management units as well as for the separate farms. Information has been collected pertaining to such characteristics as the number, size, relative importance, and major crops of certain types of multiple-unit operations.

To qualify as a multiple-unit operation, a landholding must consist of two or more farms, one of which may be the "home" farm, and all others must be operated by sharecroppers. Thus, the distinguishing feature of multiple-unit operations, as here defined, is that the landlord provides all of the work power for the farms in the unit. Statistics have been compiled for those counties in which multiple-unit operations form a significant part of the agriculture. In 1954, these counties numbered nearly 900, most of which were in the Southeast.

Distribution.—The concentration of multiple units was heaviest in the Mississippi Delta region, with pockets in eastern North Carolina and southwestern Georgia. In Mississippi, more than 35 percent of all farms were in multiple units and these units contained almost half of the cropland harvested in the State in 1954. In the multiple-unit area of Arkansas, the percentages for farms and cropland harvested were 31.2 and 38.6, respectively. At the other extreme, in the newer agricultural regions of the South—Texas and Florida—this type of farm organization is relatively insignificant. For the multiple-unit area as a whole, more than one-fifth of all farms were part of multiple-unit operations.

Cotton and tobacco.—The nature of multiple-unit operations becomes clearer when we consider the type of farming that is associated with them. Cotton and tobacco seem to be particularly well adapted to this type of operation. Nearly 35 percent of the total cotton acreage harvested was on multiple-unit farms. The percentage of cotton acreage in multiple-unit farms was 55.8 for Mississippi. The percentages of tobacco grown on multiple-unit farms were smaller. Both of these crops require large amounts of hand labor in planting, growing, and harvesting, and the cropper system provides this labor without large outlays of capital and at the time it is needed. In the production of cotton in particular, the multiple-unit organization permits concentration of managerial functions in the hands of the landlord, enables him to supervise closely his labor force, and makes unnecessary the risking of the cash outlay that the use of hired labor would involve.

Past and future.—The kinship of modern multiple-unit operations with pre-Civil War plantation organization is very clear. During the decades following the War, a number of circumstances combined to produce the cropper system as we know it today. Cotton and tobacco were even more the staples of the South than they are at present; landowners found themselves

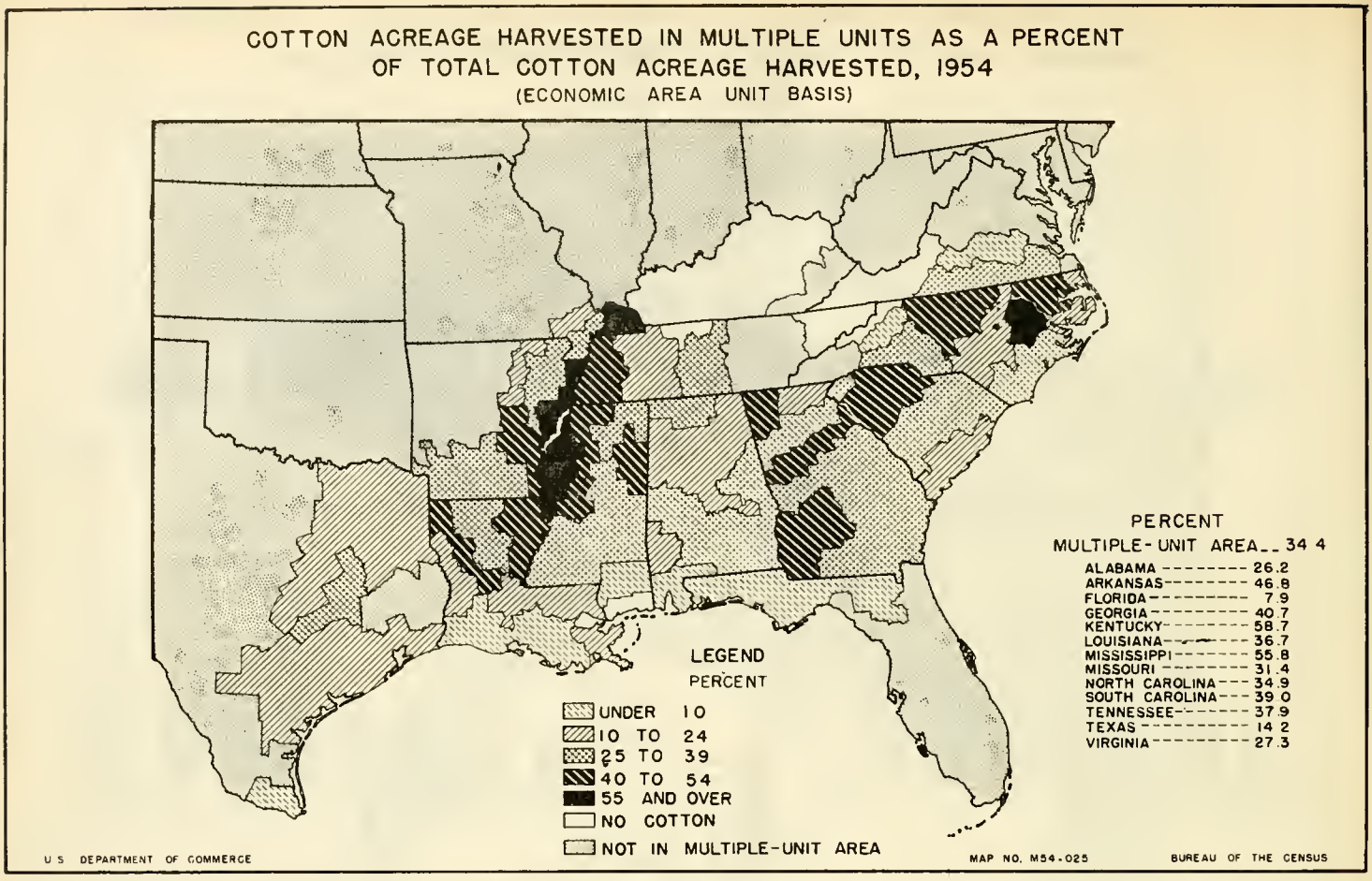


Figure 22.

in need of labor to produce these labor-intensive crops, but few had the cash for paying wage hands; and ex-slaves had virtually no alternative but to return to working the land of their former owners. The "furnish" system and the sharing of the crop developed to meet the needs of these groups.

Sharecropping and the multiple-unit operations associated with sharecropping, however, have been undergoing rather fundamental changes for the past several decades. The reasons for these declines are many and varied. Probably the most important force at work is the migration of croppers into nonfarm jobs in response to the relative attractiveness of industrial employment. Reinforcing this factor have been the shift westward of our cotton areas, the mechanization of cotton production, and the relatively low income condition of many of the cotton farmers. Perhaps the most basic development has been the rapid and continuous decline in the total number of sharecroppers, noted earlier in this report. The total has dropped from 783,459 in 1930 to 276,029 in 1954, a decrease of nearly two-thirds. As a consequence of the decrease in the number of sharecroppers, during this same period there was a substantial decline in the number of farms in multiple-unit operations. Between 1950 and 1954, the two years for which we have comparable statistics, the number of farms in multiple units (in the 1954 multiple-unit area) decreased from 466,273 to 403,186.

The decline in the number of multiple-unit farms between 1950 and 1954 has been largely in those farms producing cotton rather than tobacco.

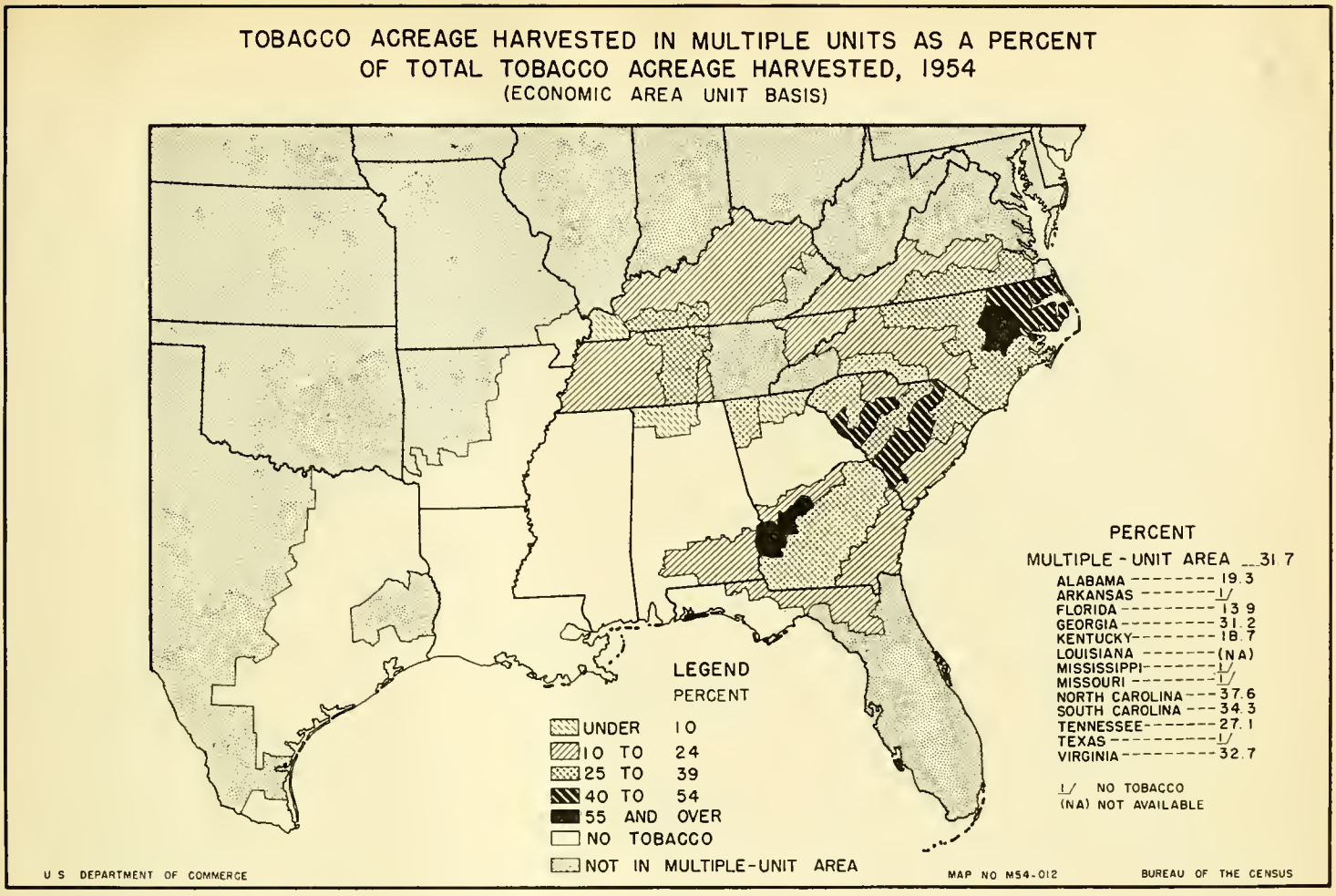

TOBACCO ACREAGE HARVESTED IN MULTIPLE UNITS AS A PERCENT
OF TOTAL TOBACCO ACREAGE HARVESTED, 1954
(ECONOMIC AREA UNIT BASIS)
LEGEND
PERCENT
UNDER 10
10 TO 24
25 TO 39
40 TO 54
55 AND OVER
NO TOBACCO
NOT IN MULTIPLE-UNIT AREA
PERCENT
MULTIPLE - UNIT AREA 31.7
ALABAMA 19.3
ARKANSAS 1/
FLORIDA 13.9
GEORGIA 31.2
KENTUCKY 18.7
LOUISIANA (NA)
MISSISSIPPI 1/
MISSOURI 1/
NORTH CAROLINA 37.6
SOUTH CAROLINA 34.3
TENNESSEE 27.1
TEXAS 1/
VIRGINIA 32.7
1/ NO TOBACCO
(NA) NOT AVAILABLE
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Figure 23.

SECTION II

Production

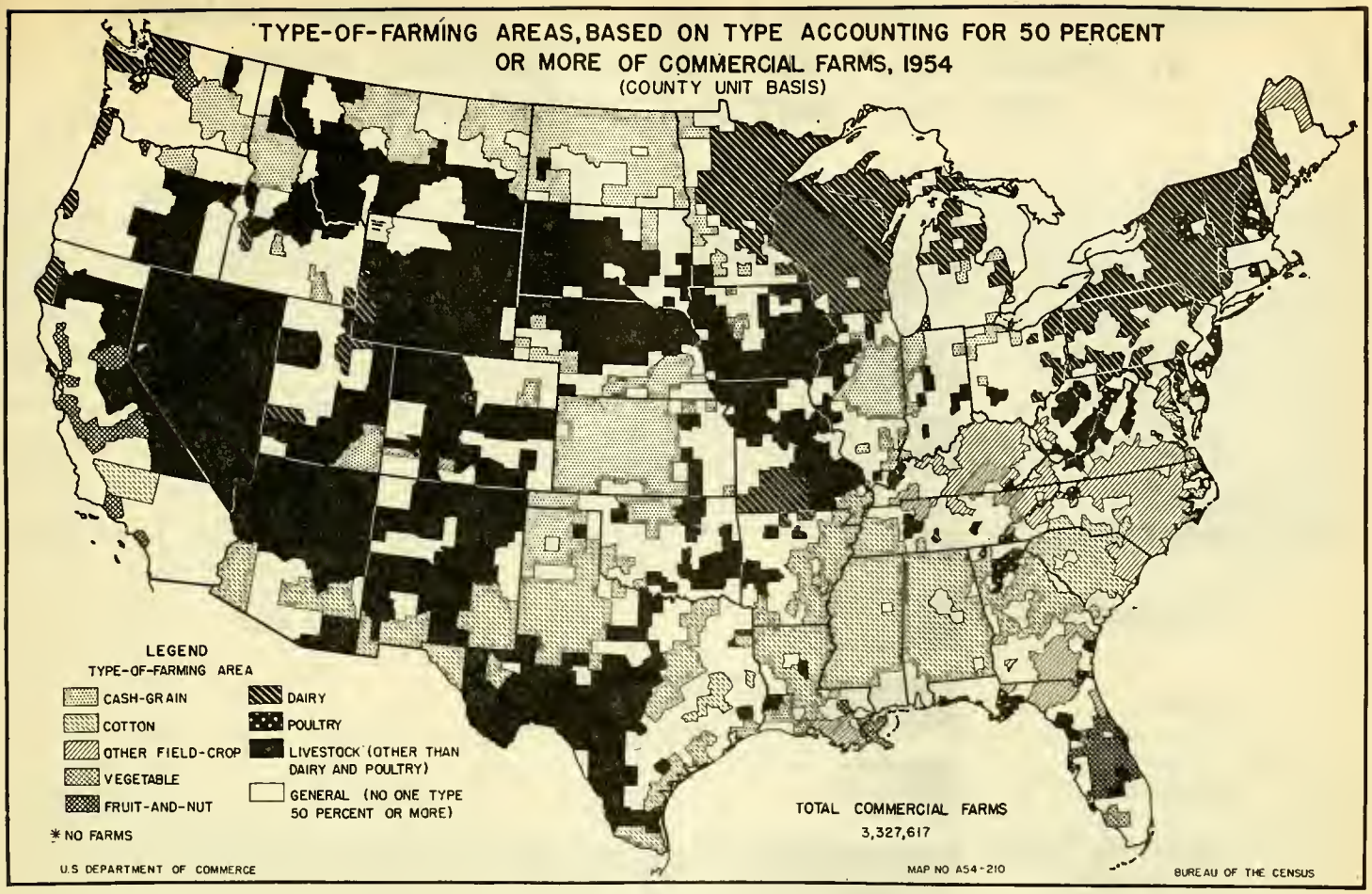


Figure 24.

TYPE OF FARMING

The vast differences in types of farming in the United States have resulted from a number of important natural economic and cultural conditions. These diverse conditions, through a varied agriculture, have been reflected in the tenure pattern.

A complex agriculture.—Such factors as variations in temperature, soil, rainfall, and the availability of land for agriculture determine the type of farming in the several areas. The wide variation in temperature has caused such areas as the Dakotas to specialize in spring wheat, barley, and flax to suit their short growing season and, in contrast, permitted the Deep South to become the world's largest cotton-producing area. The high, rugged mountain terrain of the West and the low rainfall have mostly excluded agriculture or confined it to grazing and special crops in a few restricted areas. The western mountain ranges have also been largely responsible for the lack of rainfall in much of the Great Plains area. Rainfall in the eastern one-half of the Nation, however, has been adequate to accommodate whatever the other physical and economic conditions required. Soils vary from the relatively infertile podzols of the Lakes region to the rich alluvium of the Mississippi. These and other physical and biological factors have combined with many important cultural conditions to form a complex agriculture.

No less important are the economic forces that have called for increases or decreases in production of particular types and at certain locations. Costs and returns, both in money and in gratification, have been basic in the development of agricultural production and in the ways that people work together to attain this production.

Types of farms.—In 1954, farms were classified by type on the basis of the sales of a particular product or group of products that accounted for 50 percent or more of the total value of products sold. If the sales from a product or a group of products did not represent 50 percent of the value of all products sold, the farm was called "general." Tenants operated a greater proportion of the field-crop farms than of the livestock farms. Owners and part owners operated most of the livestock farms and almost all of the poultry and fruit-and-nut farms. The "general" farms were divided tenurewise in roughly the same proportions as all commercial farms.

Cash-grain farms are found in northern and south-central Plains States and in the region of northeastern Washington. Of course, large quantities of small grains and corn are grown in the Corn Belt region, but much of the grain in this area is marketed through livestock. Of the *537,838* commercial cash-grain farms in 1954, *35.6* percent were operated by owners, *31.5* percent by part owners, and *32.7* percent by tenants. Since 1950, the number of commercial cash-grain farms had increased by *107,449*. *Fifty-two* percent of this increased number were operated by full owners, *36* percent by part owners, and only *13* percent by tenants.

Cotton farms, which are traditionally labor-intensive (but are rapidly becoming more mechanized in the commercial areas), are operated mainly under rental arrangements. In 1954, the *525,208* commercial cotton farms were *24.3* percent full owner operated, *16.2* percent part owner operated and *59.3* percent tenant operated. *Twenty-eight* percent of the commercial cotton farm operators were croppers. There were *84,099* fewer commercial cotton farms in 1954 than in 1950. During this period there was an increase in the mechanization of cotton farming and a heavy migration of labor out of agriculture.

PERCENT OF FARMS IN EACH TYPE-OF-FARM GROUP, BY TENURE OF OPERATOR, COMMERCIAL FARMS FOR THE UNITED STATES: 1954

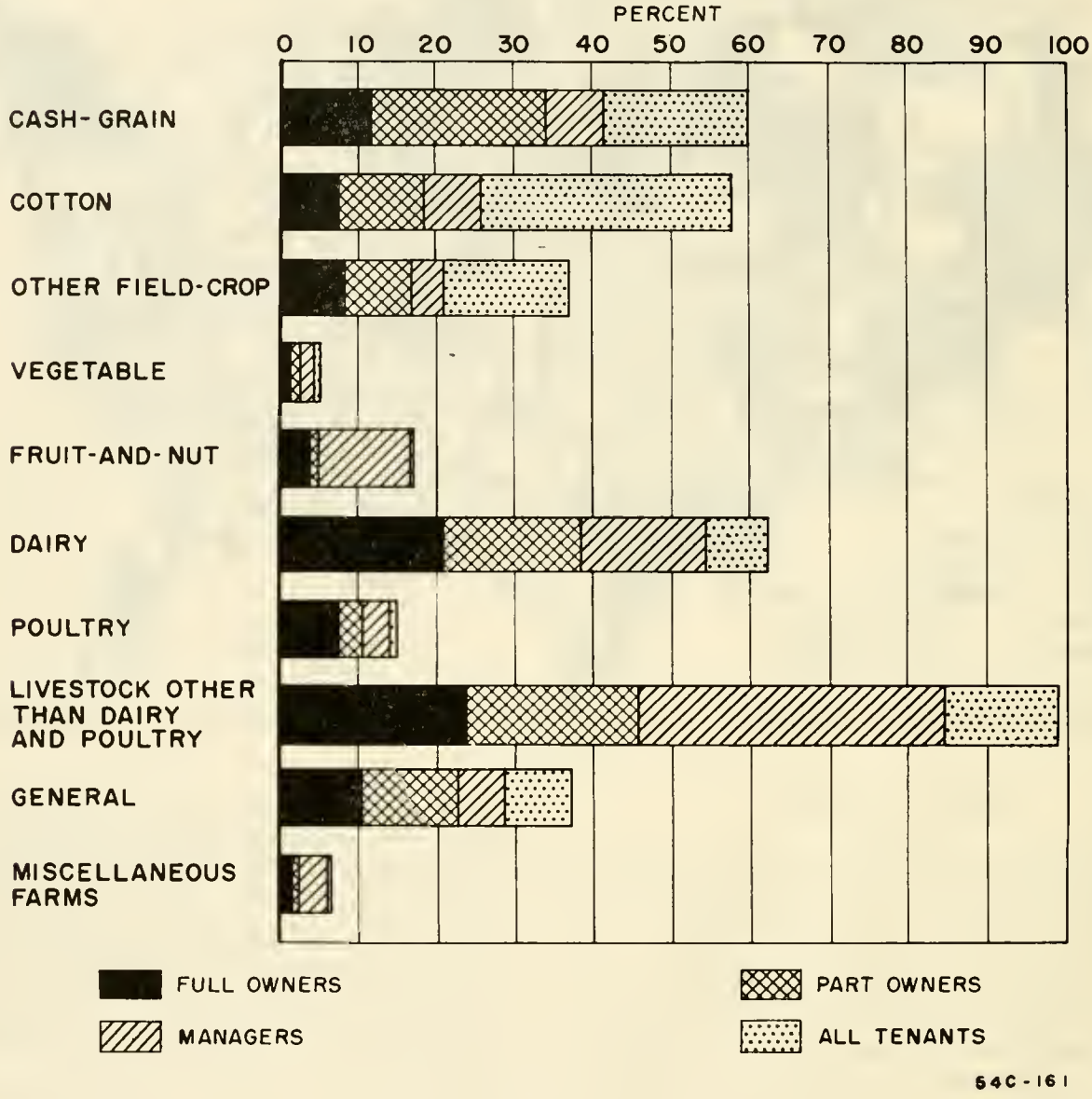


Figure 25.

Other field-crop farms are those growing peanuts, potatoes, tobacco, sugarcane, and sugar beets. Of these crops, tobacco is most significant in Virginia, North Carolina, and Kentucky. Sugarcane predominates in southern Louisiana. Farms classified by type on the basis of potatoes, peanuts, and sugar beets do not predominate in most of the areas where these crops are grown. A much higher proportion of these crops are grown on other types of farms. Tobacco and peanut enterprises are associated with the relatively high rate of tenancy on "other field-crop" farms. Full owners comprised *38.5* percent, part owners, *18.1* percent; and tenants, *43.3* percent of other field-crop farms in 1954.

Vegetable farms, which involve relatively small acreages of highly developed land and require very close supervision and management, are most frequently operated by owners or part owners. In 1954, *52.0* percent of commercial vegetable farms were full-owner-operated, *29.8* percent were part-owner-operated, and only *17.1* percent tenant-operated.

(Continued on page 188)

TABLE 1.—PERCENT DISTRIBUTION OF COMMERCIAL FARMS IN EACH TYPE-OF-FARM GROUP, BY TENURE OF OPERATOR, FOR THE UNITED STATES: 1954

[Data are based on reports for only a sample of farms]

Type of farm	Tenure of operator				All commercial farms
	Full owners	Part owners	Managers	Tenants	
	Percent	*Percent*	*Percent*	*Percent*	*Percent*
All commercial farms	47.9	22.7	0.5	28.8	100.0
Cash-grain	35.6	31.5	.2	32.7	16.2
Cotton	24.3	16.2	.2	59.3	15.8
Other field-crop	38.5	18.1	.2	43.3	11.1
Vegetable	52.0	29.8	1.1	17.1	1.0
Fruit-and-nut	81.7	11.5	2.5	4.3	2.5
Dairy	61.6	24.3	.5	13.6	16.5
Poultry	83.0	10.2	.5	6.4	4.6
Livestock other than dairy and poultry	55.3	24.2	1.0	19.6	20.9
General	48.9	27.3	.3	23.5	10.4
Miscellaneous	80.6	12.2	1.9	5.4	1.1

PERCENT OF VALUE OF SPECIFIED CROPS AND LIVESTOCK SOLD, BY TENURE OF OPERATOR FOR COMMERCIAL FARMS, FOR THE UNITED STATES: 1954

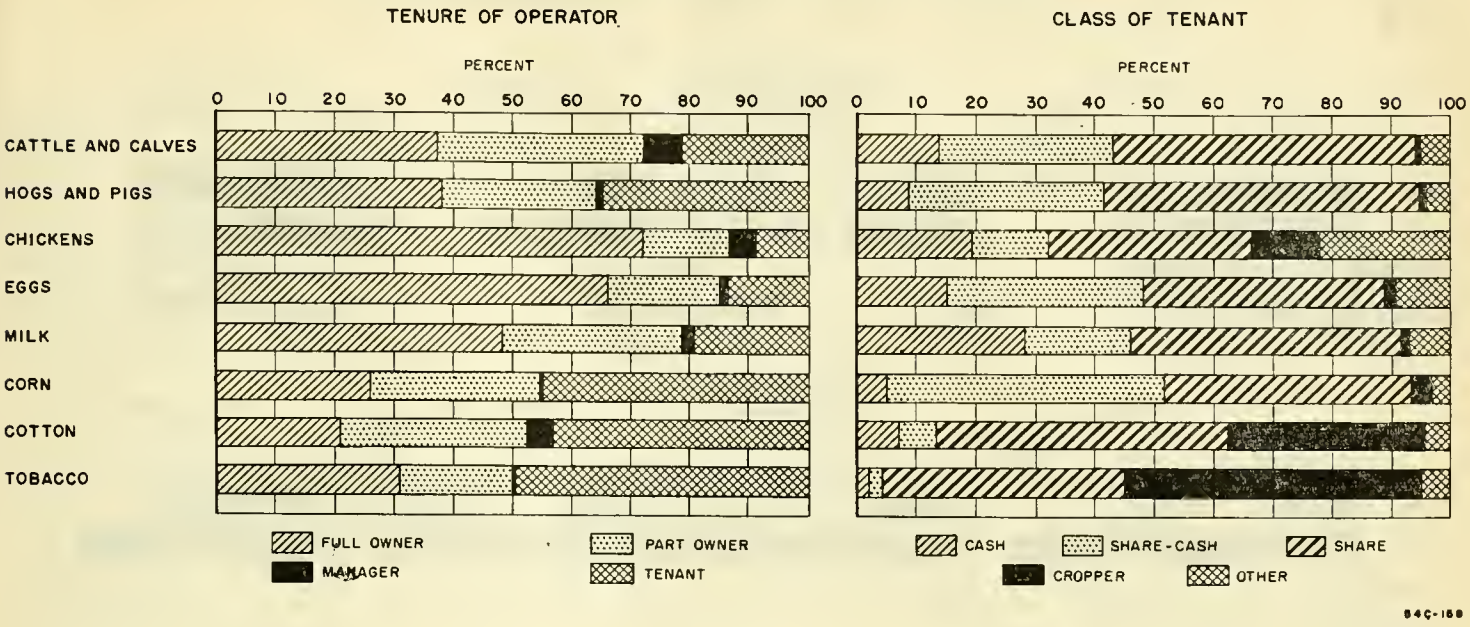


Figure 26.

CROP AND LIVESTOCK OUTPUT

The volume of production.—Estimates made by the United States Department of Agriculture indicate that gross cash marketings in 1954 totaled more than $30 billion, or just $3 billion under the all-time high for cash marketings of $33 billion reached in 1951. As a measure of total physical volume of production, without effects of price variation, the United States Department of Agriculture's index of farm marketings gives some idea of the growth of farm production. According to this index of farm marketings (based on 1947–49=100), aggregate production rose from 51 in 1910 and 100 in 1950 to 111 in 1954. The index of livestock products (based on 1947–49=100) rose from 50 in 1910 and 103 in 1950 to 117 in 1954. The index of crops grown (based on 1947–49=100) rose from 53 in 1910 and 96 in 1950 to 102 in 1954. The volume of production in terms of the index of farm marketings was, at that time, an all-time high. Crops had fallen off somewhat from previous years, but this was representative of the shifts in type of production toward livestock, not a reduction of overall output.

Although total value of all farm products sold by tenure of operator was not available from the 1954 Census of Agriculture, some specified crop and livestock values were reported. The commodities that are classified by tenure of the operator may be used to illustrate the relationship between the production processes and tenure.

The different tenure forms, as they are commonly used, have particular characteristics that adapt them to certain types of production. Around each type of agriculture there have evolved tenure arrangements associated with that particular type of agriculture. Some of the factors that might have influenced this are the relative importance of a farm as a home; the relative degree of skill that may be required; the amount of labor required; the relative importance of investment in buildings, land, livestock, and machinery; the kind and degree of government controls and incentives; the risks involved; and the length of the production cycle.

Crops.—Full owners on commercial farms operated *31.1* percent of the *78,133,608* acres of cornland; part owners, *29.8* percent; managers, *0.8* percent; and tenants, *33.6* percent. On full-owner farms, *23.7* percent of the cropland harvested was in corn; on part-owner farms, *19.0* percent; on manager farms, *11.5* percent; and on tenant farms, *28.7* percent. The tendency for tenants to have a large portion of their cropland in corn is slightly more pronounced in the case of corn grown for grain. Acres of corn grown for grain as a percent of all cropland harvested was *19.4* for full owners, *15.6* for part owners, *8.8* for managers, and *26.2* for tenants. Virtually all of the corn produced by tenants in the commercial corn area is grown on farms that have crop-share or share-cash leases, and the corn itself is usually grown on a share arrangement.

A relatively large percent of the cotton acreage is operated by tenants. In 1954, *43.6* percent of the acreage in cotton was operated by tenants on commercial farms, whereas *20.0*, *30.1*, and *2.3* percent, respectively, were operated by full owners, part owners, and managers. Sharecropping and crop-share tend to be the most common leasing arrangements. In such arrangements, it is a rather common practice for the landlord to contribute a high degree of supervision.

(*Continued on page 188*)

TABLE 2.—PERCENT DISTRIBUTION OF THE VALUE OF SPECIFIED CROPS AND LIVESTOCK SOLD, BY TENURE OF OPERATOR OF COMMERCIAL FARMS, FOR THE UNITED STATES: 1954

[Data are based on reports for only a sample of farms]

Item	Full owners	Part owners	Managers	All tenants	Tenants				
					Cash	Share-cash	Crop- and livestock-share	Croppers	Other and unspecified
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Corn	26.1	29.0	0.7	44.2	5.2	46.6	41.9	3.2	3.1
Cotton	21.0	31.9	4.3	42.7	7.2	6.5	48.6	33.4	4.3
Tobacco	31.1	18.9	.6	49.4	2.0	2.3	40.9	50.3	4.4
Cattle and calves	37.5	34.9	6.6	21.0	14.3	29.0	50.9	.9	4.9
Hogs and pigs	38.3	26.3	.9	34.4	9.1	32.6	53.2	1.2	3.9
Chickens	72.5	14.7	3.7	9.1	19.6	12.6	34.4	11.5	21.9
Eggs	66.8	18.8	1.5	12.9	15.5	33.0	40.5	1.4	9.6
Milk	48.7	30.7	1.7	18.9	28.3	17.4	45.4	1.2	7.6

PERCENT OF CROPLAND HARVESTED REPRESENTED BY ACRES HARVESTED OF THE PRINCIPAL CROPS. BY TENURE OF OPERATOR, FOR COMMERCIAL FARMS FOR THE UNITED STATES AND REGIONS: 1954

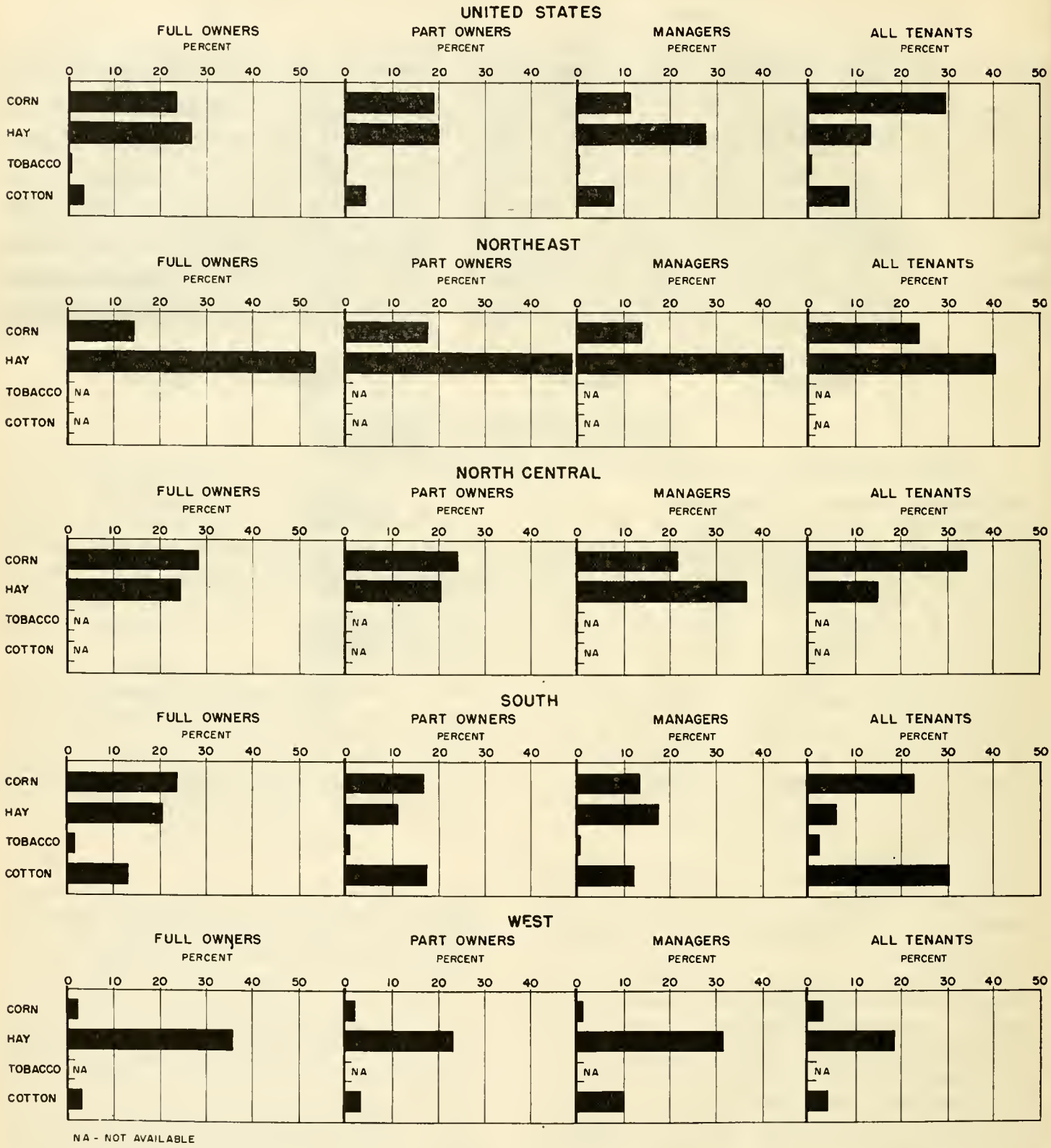


Figure 27.

PERCENT DISTRIBUTION OF ACRES OF THE PRINCIPAL CROPS HARVESTED, BY TENURE OF OPERATOR, FOR COMMERCIAL FARMS, FOR THE UNITED STATES AND REGIONS: 1954

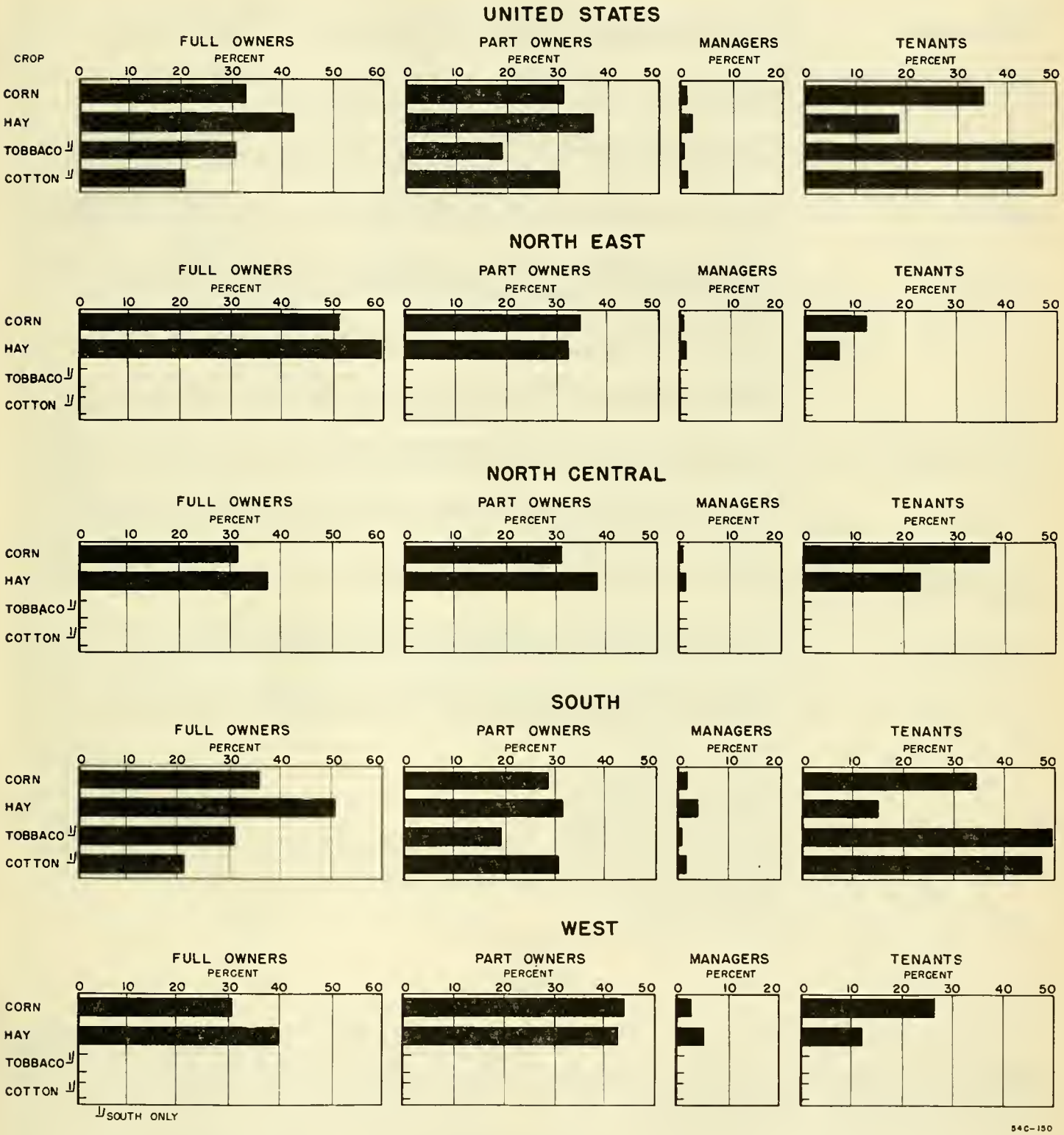


Figure 28.

PERCENT DISTRIBUTION OF ALL LAND IN FARMS ACCORDING TO MAJOR USES, BY TENURE OF OPERATOR, FOR THE UNITED STATES: 1945 - 1954

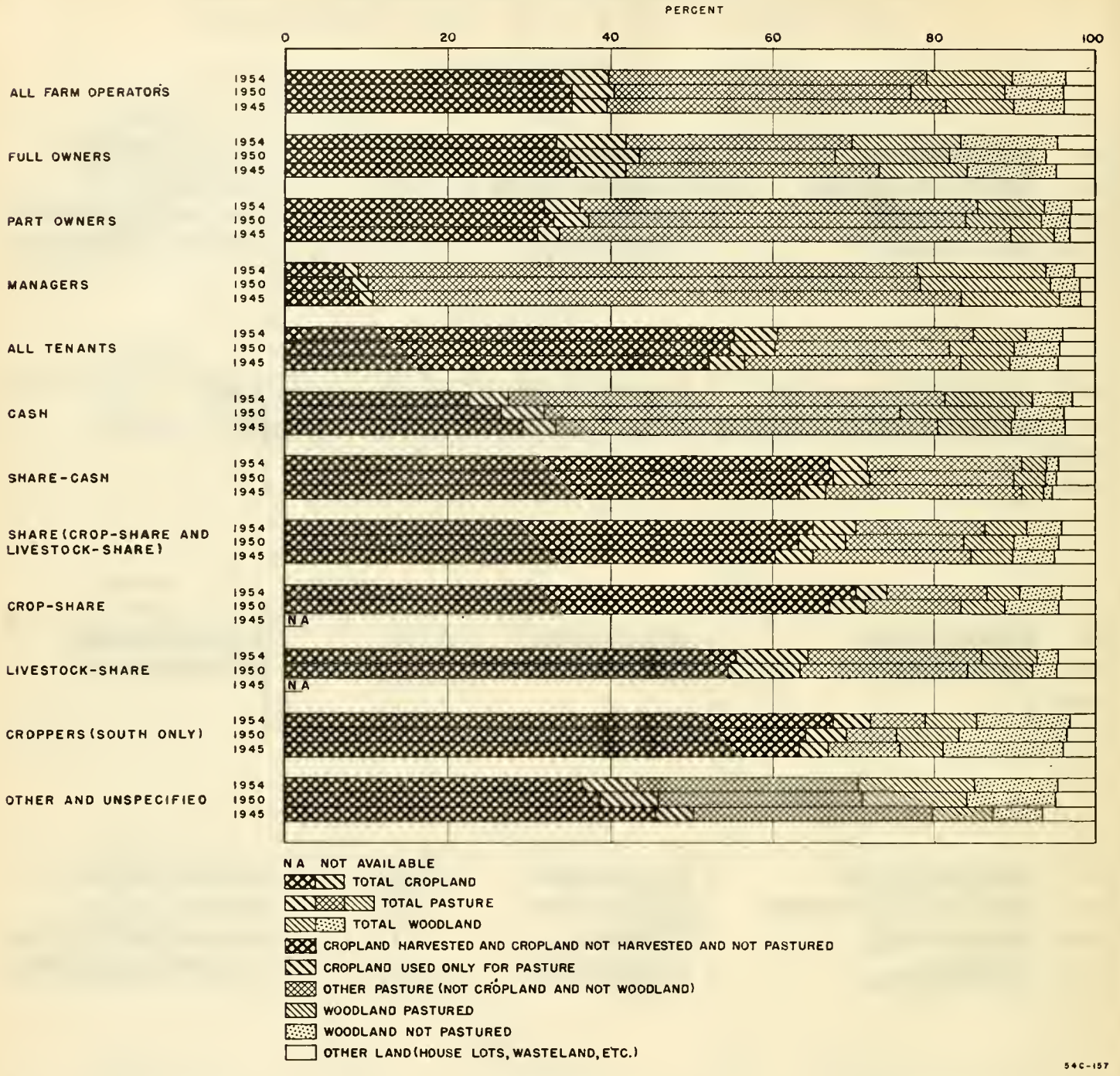


Figure 29.

LAND USE

Major land uses.—The total acreage of cropland in the United States declined from *479,371,116* acres in 1949 to *461,937,776* acres in 1954. The acreage of pastureland, however, increased from *619,691,813* in 1949 to *647,366,156* in 1954. Although total cropland declined, the cropland per farm increased from *94.8* acres in 1949 to *104.3* in 1954. Cropland in commercial farms averaged *122.5* acres in 1949 and *133.9* acres in 1954. The average acreage of cropland increased in all tenures, except for managers, but the average acreage of pasture showed even greater increases.

Since tenants tend toward crop production and managers toward livestock production, it is not surprising that in 1954 the cropland in commercial tenant-operated farms represented a higher percentage of all land in their farms than for any other tenure, *61.8*, and the cropland in commercial manager-operated farms represented the lowest percentage, *13.2*.

Commercial farms operated by tenants under crop-share lease arrangements tend to have the highest proportion of cropland. In 1954, *74.8* percent of land in commercial crop-share farms was cropland, and *20.0* percent was pastureland. In contrast, cropland in commercial cash-rented farms was only *27.3* percent of the land in farms and pastureland was *70.9* percent. Cropper farms, of course, contain a very high proportion of cropland since they are associated almost exclusively with cash-crop enterprises, notably cotton and tobacco. In 1954, for commercial cropper

PERCENT DISTRIBUTION OF CROPLAND, LAND PASTURED, AND WOODLAND BY TENURE OF OPERATOR, FOR COMMERCIAL FARMS FOR THE UNITED STATES AND REGIONS: 1954

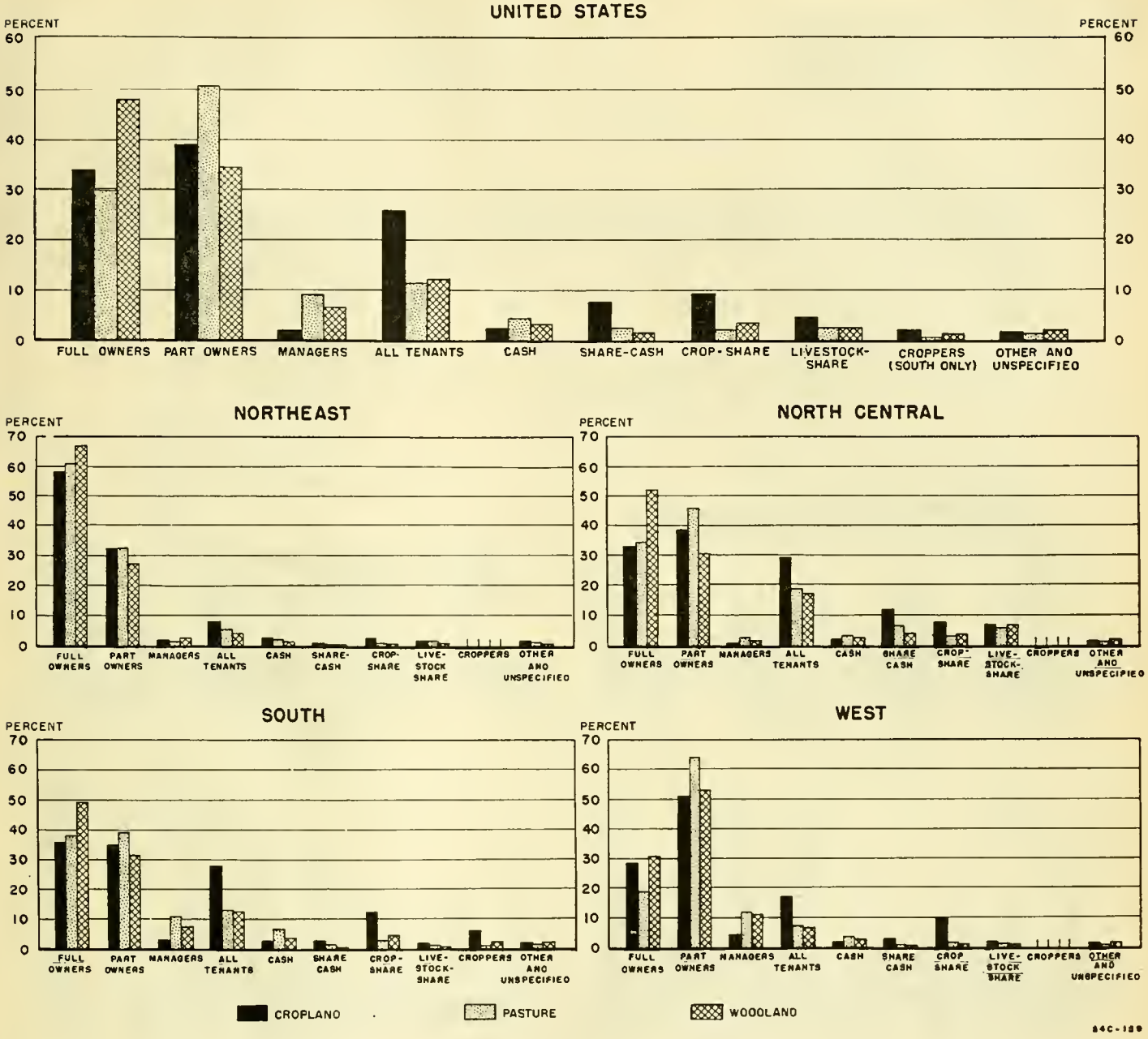


Figure 30.

farms *73.1* percent of the land was cropland and *17.2* percent, pastureland. Much of the woodland and pastureland of multiple-unit operations is retained in the home farm.

Regional variations.—In the Northeast, the largest proportion of both cropland and pastureland is operated by full owners. This is in contrast with the West where a major share of each is operated by part owners. In the South and North Central regions, tenants account for a greater share of cropland than in the other two regions. Tenant farms with crop-share leases generally contain a high proportion of cropland in all regions, particularly in the West and South. Livestock-share arrangements are most common in the North Central region.

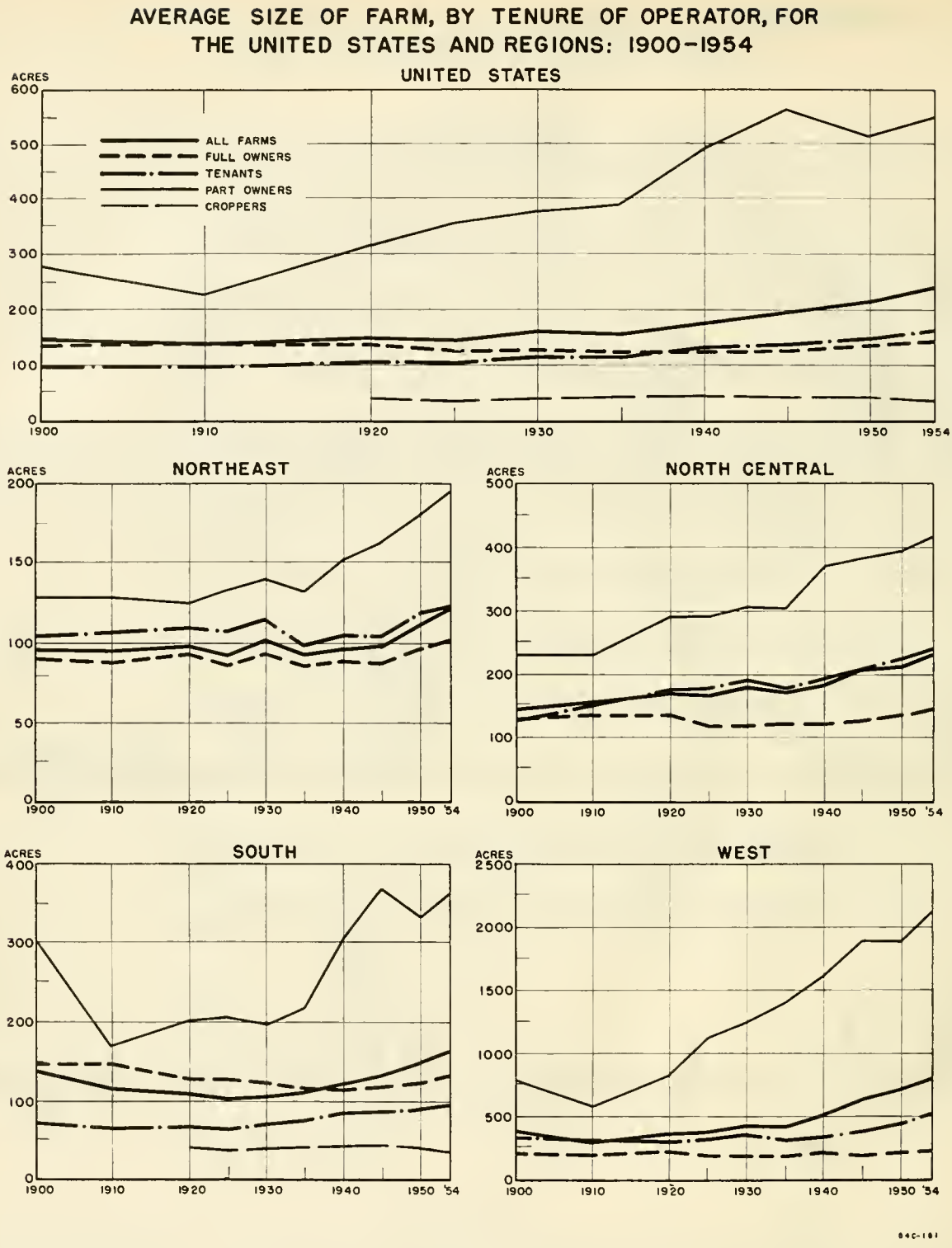


Figure 31.

SIZE OF FARM

Increases in farm size.—One of the outstanding characteristics of twentieth century agriculture in the United States has been the growth in farm size. Since the total acreage of land in farms has changed little in this period, it follows that most of the increase in average farm size has come from the reduction in farm numbers. In 1954, 599,746 fewer farms were recorded than in 1950, while the average size of farm increased from 215.3 acres to 242.2 acres. For the United States as a whole, this trend toward larger and fewer farms is accelerating.

The largest increases in average farm size have taken place in part-owner farms. Since 1910, the only reduction in the size of farms operated by part owners occurred in the post World War II period. Part of this reduction may have been due to the return of servicemen whose lands had been operated under lease by other farmers. Between 1950 and 1954, the average size of part-owner farms increased 36.7 acres or 7.2 percent. Part-owner farms have increased in number and in acreage per farm since 1950. Both owner and tenant farms have increased in size since 1935.

Acreage is only one measure of farm size. Other factors of production such as labor, capital, and management also must be

taken into account if anything is to be said about the relative productivity of various sizes of farms. Farm size is most important in relation to tenure as tenure affects (*1*) the total quantity and (*2*) the proportions of various factors used on the farm. Quality of the land, as well as rainfall, soil, temperature, slope, and location, is important in comparisons of farm size in different regions. To a certain extent, quality of land is associated with tenure. For example, manager-operated farms contain a much higher proportion of uncultivated and low valued land than do tenant farms. For the United States as a whole, in 1954, tenant farms were the only farms on which the average acreage pastured did not exceed the average acreage of cropland.

Farm size by regions.—In all regions, with but one exception, average farm size ranged upward from full owners, tenants, part owners to managers. The exception occurred in the South where the average size of farms of full owners was greater than that of tenants. The low average size of tenant farms in the South can be attributed largely to the small acreages operated by

(*Continued on page 189*)

TABLE 3.—AVERAGE SIZE OF FARM, BY TENURE OF OPERATOR, FOR THE UNITED STATES AND REGIONS, 1954 AND 1950

Tenure of operator	United States	Northeast	Northwest	South	West
All farms:	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*
1954	242.2	120.9	230.9	166.7	798.2
1950	215.3	111.0	212.2	148.2	702.9
Full owners:					
1954	144.5	102.4	145.7	132.4	234.2
1950	135.6	97.6	137.3	123.2	225.2
Part owners:					
1954	548.7	195.2	418.1	360.9	2,112.4
1950	512.0	179.2	397.4	332.3	1,889.3
Managers:					
1954	4,835.8	460.7	1,187.5	2,941.4	14,830.9
1950	4,473.2	390.1	1,234.5	2,989.6	13,168.2
Tenants:					
1954	164.9	124.5	243.1	95.5	511.0
1950	146.8	119.1	222.8	89.7	449.7

PERCENT DISTRIBUTION OF SIZE GROUP OF CROPLAND HARVESTED, BY TENURE OF OPERATOR, FOR COMMERCIAL FARMS, FOR THE UNITED STATES AND REGIONS: 1954

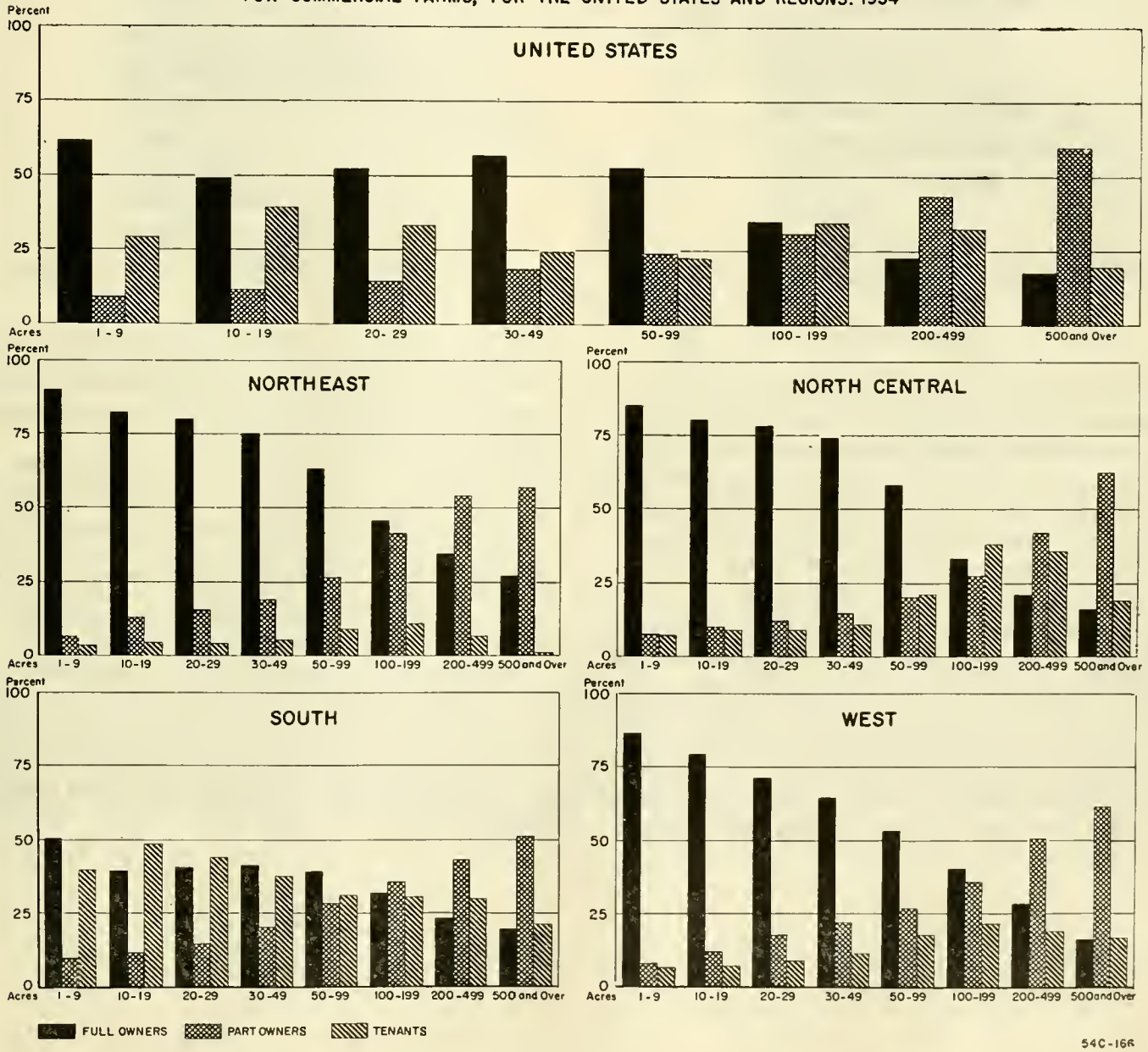


Figure 32.

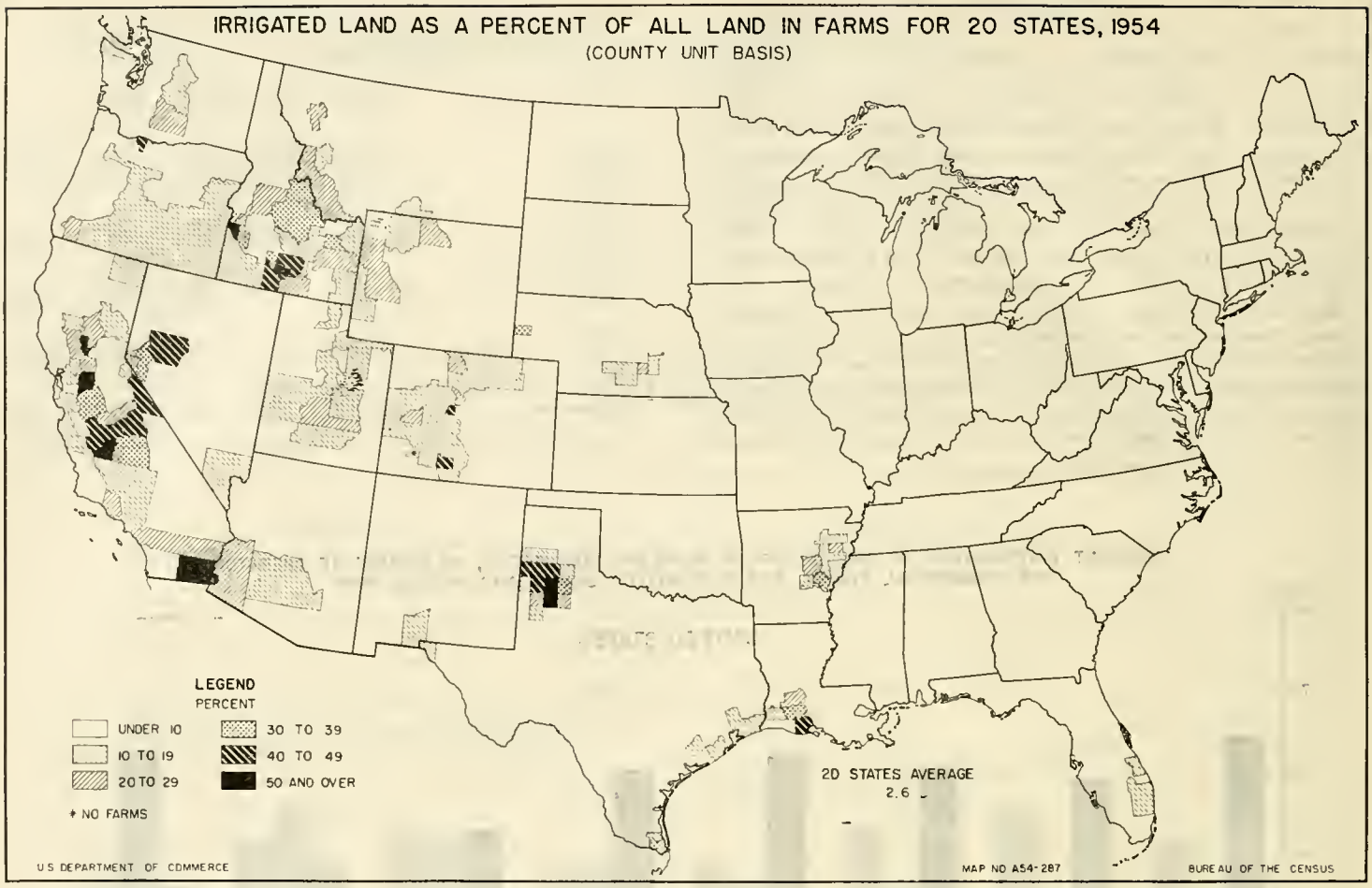


Figure 33.

IRRIGATION

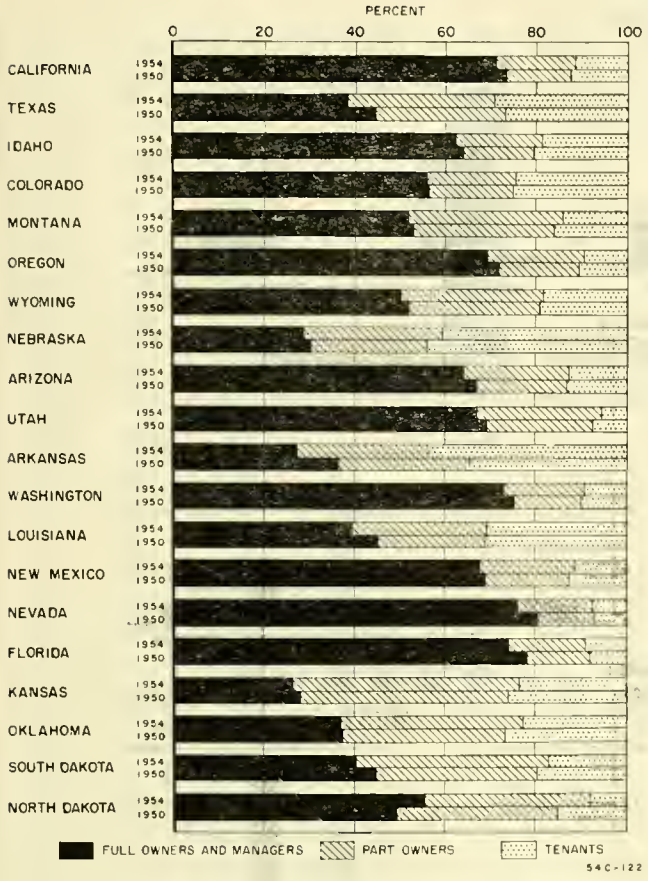
Irrigated farms and acreage.—The United States, in 1954, contained *324,437* farms reporting some irrigation. These farms reported *29,799,482* acres irrigated or *2.6* percent of all farmland. The farms reporting irrigation represented *6.8* percent of all farms and *8.0* percent of commercial farms. The average size of commercial irrigated farms was *109.7* acres in 1954, an increase of *8.5* acres since 1949. There were *17,820* more irrigated farms in 1954 than in 1949. In 1954, *58.6* percent of all the irrigated farms were full-owner operated and *23.0* percent were part-owner operated. Of all the irrigated land in farms, *34.2* percent was operated by full owners and *38.5* percent by part owners. Tenants operated *16.8* percent of the irrigated farms and *20.2* percent of the irrigated land. Managers operated *1.6* percent of all the irrigated farms and *7.1* percent of all irrigated land.

Regional variations.—Irrigation is of considerably greater importance in the relatively arid West than in the eastern portions of the country. In the 17 Western States and Arkansas, Florida, and Louisiana, *301,870* farms reported *29,183,428* acres irrigated in 1954. The most extensive areas of irrigation are found in the far western States such as Nevada, Arizona, Idaho, and California. In Nevada, for example, 87.8 percent of the farms reported some irrigation, whereas, in North Dakota, only 0.6 percent of the farms were irrigated. In the 20 States, the irrigated cropland harvested was reported for 271,160 farms and amounted to 24,419,703 acres or 90.1 acres per farm.

The tenure of operators of irrigated farms varied among the States. In Colorado, about one-fourth of the irrigated farms, and 22.4 percent of all farms, were tenant operated. However, in Utah where 85.0 percent of all farms were irrigated, only *5.1* percent of the irrigated farms and 5.6 percent of all farms were operated by tenants. In Louisiana and Arkansas a relatively small percent of all farms were irrigated, but all the rice was produced by irrigation; in these two States, respectively, *30.3* and *43.1* percent of the irrigated farms were tenant operated.

The pattern of tenure on irrigated land in farms is similar to that suggested by the number of farms. In Nebraska, in 1954, *42.5* percent of the irrigated land was tenant-operated. Arkansas, with *37.7* percent tenant-operated and Louisiana, with *34.8* percent, had relatively larger proportions of their irrigated land in farms operated by tenants. Managers operated *24.1* percent of the irrigated farmland in Florida where a large part of the truck-crop production is irrigated.

PERCENT DISTRIBUTION OF IRRIGATED FARMS, BY TENURE OF OPERATOR FOR 17 WESTERN STATES, ARKANSAS, LOUISIANA AND FLORIDA, 1954 AND 1950



PERCENT DISTRIBUTION OF IRRIGATED LAND IN FARMS BY TENURE OF OPERATOR, 17 WESTERN STATES, ARKANSAS, LOUISIANA, AND FLORIDA, 1954 AND 1950

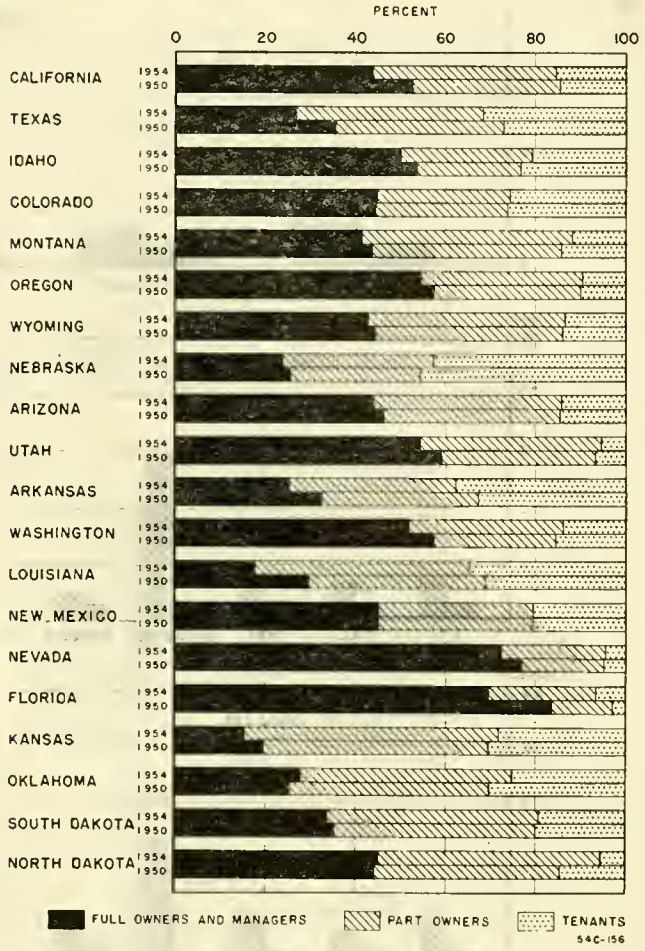


Figure 34.

Table 4.—PERCENT DISTRIBUTION OF IRRIGATED FARMS AND LAND IN FARMS, BY TENURE OF OPERATOR, FOR 17 WESTERN STATES, ARKANSAS, LOUISIANA, AND FLORIDA: 1954

[Data are based on reports for only a sample of farms]

State	Irrigated farms			Irrigated acres		
	Full owners and managers	Part owners	Tenants	Full owners and managers	Part owners	Tenants
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Total, 20 States	60.6	22.8	16.6	41.1	38.6	20.4
California	71.5	17.2	11.3	43.8	40.9	15.3
Texas	38.7	32.3	29.0	26.8	41.4	31.7
Idaho	62.7	18.8	18.6	50.0	29.2	20.8
Colorado	56.4	19.6	24.0	44.5	29.7	25.8
Montana	52.3	34.0	13.7	41.2	47.0	11.8
Oregon	69.9	21.0	9.2	54.4	35.7	9.9
Wyoming	50.5	31.3	18.2	42.7	44.0	13.3
Nebraska	29.1	30.3	40.7	23.6	33.9	42.5
Arizona	64.3	23.3	12.3	43.8	41.9	14.2
Utah	67.5	27.4	5.1	54.2	40.5	5.2
Arkansas	27.7	29.1	43.1	25.2	37.1	37.7
Washington	73.8	17.4	8.9	52.0	34.2	13.9
Louisiana	39.9	29.9	30.3	17.3	47.9	34.8
New Mexico	68.1	20.8	11.1	45.0	34.5	20.5
Nevada	76.9	15.9	7.3	72.3	23.3	4.4
Florida	74.8	16.5	8.7	69.4	24.0	6.6
Kansas	26.7	50.2	23.0	15.5	56.4	28.1
Oklahoma	37.7	40.0	22.4	28.0	47.0	25.1
South Dakota	40.2	43.0	16.8	33.9	46.8	19.2
North Dakota	55.7	36.5	7.8	44.2	50.1	5.7

NUMBER OF FAMILY WORKERS (INCLUDING OPERATOR) AND HIRED WORKERS PER FARM REPORTING, COMMERCIAL FARMS, BY TENURE OF OPERATOR, UNITED STATES AND REGIONS: 1954

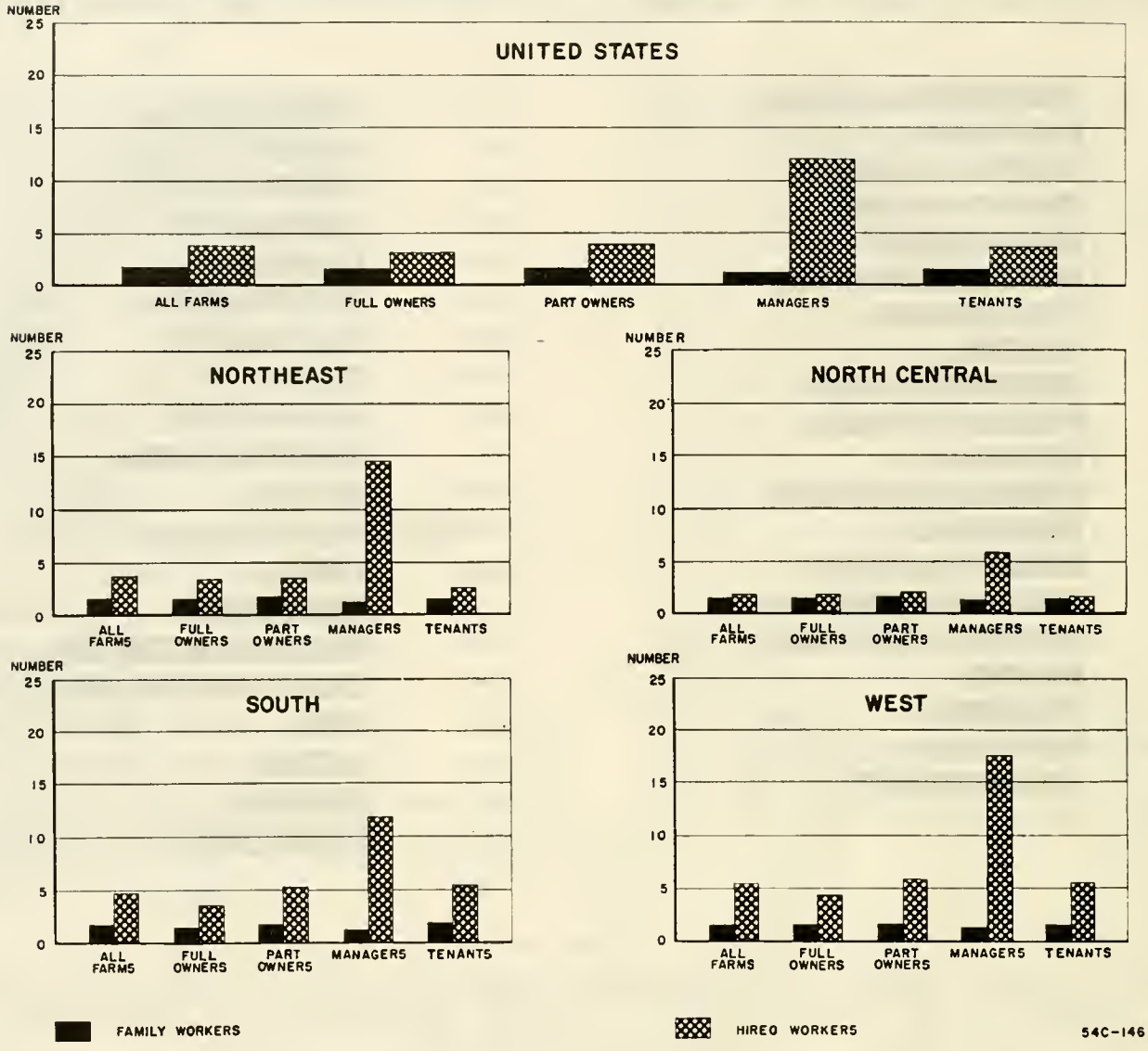


Figure 35.

FARM LABOR

Changes in the use of farm labor.—Labor, measured in terms of total value of production, remains the most important factor in agricultural production. However, the general trend in the pattern of production has been a substitution of capital for labor. Mechanization and other features of the production process bringing about a capital-labor substitution have been important in reducing the total man-hours of work on farms by one-fourth since World War II and about 15 percent since 1947–49. Most of this reduction of labor has come about in crop production.

The total amount of labor used for farm work, as estimated by the United States Department of Agriculture, has declined from 22,547 million man-hours in 1910 to 14,642 million man-hours in 1954. While these reductions in labor were taking place, substantial increases were being made in total agricultural production. The result is that the index of output per man-hour (base 1947–49=100) has increased from 46 in 1910 and 112 in 1950, to 126 in 1954.

Estimates by the United States Department of Agriculture indicate that in 1954 there was an annual average of 8,451,000 persons employed on farms, of which 6,521,000 were hired workers. These estimates show that the number of persons employed in agriculture has declined since the end of World War I. The index of farm employment (base 1910–14=100) had declined from 69 in 1950 to 62 in 1954. More of the drop in the farm

TABLE 5.—NUMBER OF FAMILY (INCLUDING OPERATOR) AND HIRED WORKERS PER FARM REPORTING,[1] COMMERCIAL FARMS, BY TENURE OF OPERATOR, UNITED STATES AND REGIONS: 1954

[Data are based on reports for only a sample of farms]

Area and type of worker	All farms	Full owners	Part owners	Managers	Tenants
United States:	*Number*	*Number*	*Number*	*Number*	*Number*
Family workers	1.7	1.6	1.8	1.3	1.8
Hired workers	3.8	3.2	4.0	12.2	3.9
Northeast:					
Family workers	1.7	1.7	1.8	1.4	1.6
Hired workers	3.6	3.4	3.6	14.7	2.7
North Central:					
Family workers	1.7	1.7	1.8	1.3	1.6
Hired workers	2.0	2.0	2.1	6.0	1.8
South:					
Family workers	1.8	1.6	1.8	1.3	2.0
Hired workers	4.8	3.6	5.3	12.0	5.4
West:					
Family workers	1.6	1.6	1.7	1.2	1.6
Hired workers	5.5	4.5	5.9	17.5	5.6

[1] For specified dates: September 26–October 3 for 33 States and October 24–30 for 15 States.

EXPENDITURE FOR HIRED LABOR PER COMMERCIAL FARM, BY TENURE OF OPERATOR, FOR THE UNITED STATES AND REGIONS: 1954

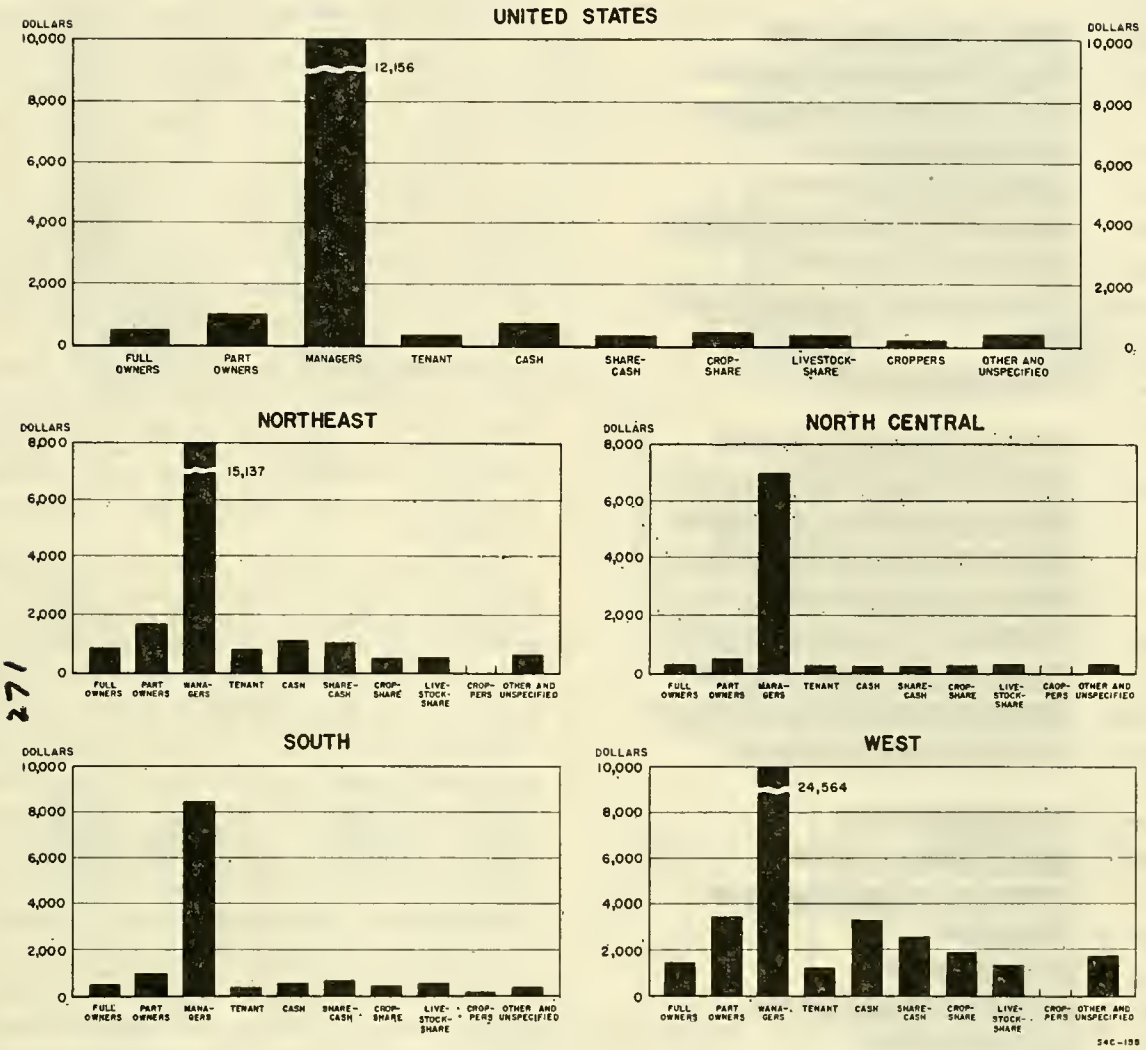


Figure 36.

employment index in this period appears to be due to the 700,000 decrease in number of family workers than to the 160,000 decrease in number of hired workers. The index of family workers decreased from 71 in 1950, to 64 in 1954, while the index of hired workers decreased from 61 to 57.

Labor as a factor of production.—Labor has certain characteristics distinguishing it from land and capital that are important to farm tenure. Most, and frequently all, of the labor is contributed by the farm operator in all major types of tenure with the exception of manager-operated farms. Even on manager-operated farms the operator generally makes substantial contributions of labor himself in addition to exercising control of the hired labor. This means that, although ownership and control of land and capital may vary by tenure type, the labor input is regulated primarily by the operator in all tenures. Another important characteristic of labor, in its relation to tenure, is that labor services must be used as they become available—they cannot be stored up. The availability of labor during critical periods may be an important element, for example, in setting the terms of a leasing agreement. Another important characteristic of the labor factor is that, since it is attached directly to a person, its mobility and use are partly affected by nonmonetary work preferences, habits, and other values of the individual. Therefore, a farm tenure arrangement usually reflects more than the monetary interests of the parties involved.

The quantity of labor which the operator combines with other factors of production depends upon the amount of the expected reward and the probability of receipt of the reward. Tenure may affect either. A leasing arrangement, for example, may divide the return to several enterprises, each on a different basis. Under such conditions the tenant will tend to devote his labor to those enterprises that yield him the greatest return, neglecting the enterprises favoring the landlord. Uncertainty of the length of tenure may cause tenants to favor the use of their labor for enterprises that yield immediate return. The tenure of owner-operators includes responsibility for mortgages, taxes, and government payments, and these conditions may affect the way in which labor is used. Large debt or tax commitments will tend to cause operators, who wish to protect their equity in the farm, to shift their labor into more certain crops even though their long-run average return may be lower.

The tenure of the operator also appears to be related to the kind of labor (family or hired) used on the farm. Part of this may be due to the different sizes of units, variations in type of farm, and the financial condition associated with different tenures.

Farm workers by tenure of farm operators.—The same major tenure categories of farms that have relatively large acreages also have large numbers of farm workers. In 1954, the average

(Continued on page 189)

PERCENT OF FARMS REPORTING TRACTORS (OTHER THAN GARDEN) BY TENURE OF OPERATOR, COMMERCIAL FARMS, UNITED STATES AND REGIONS: 1954 AND 1950

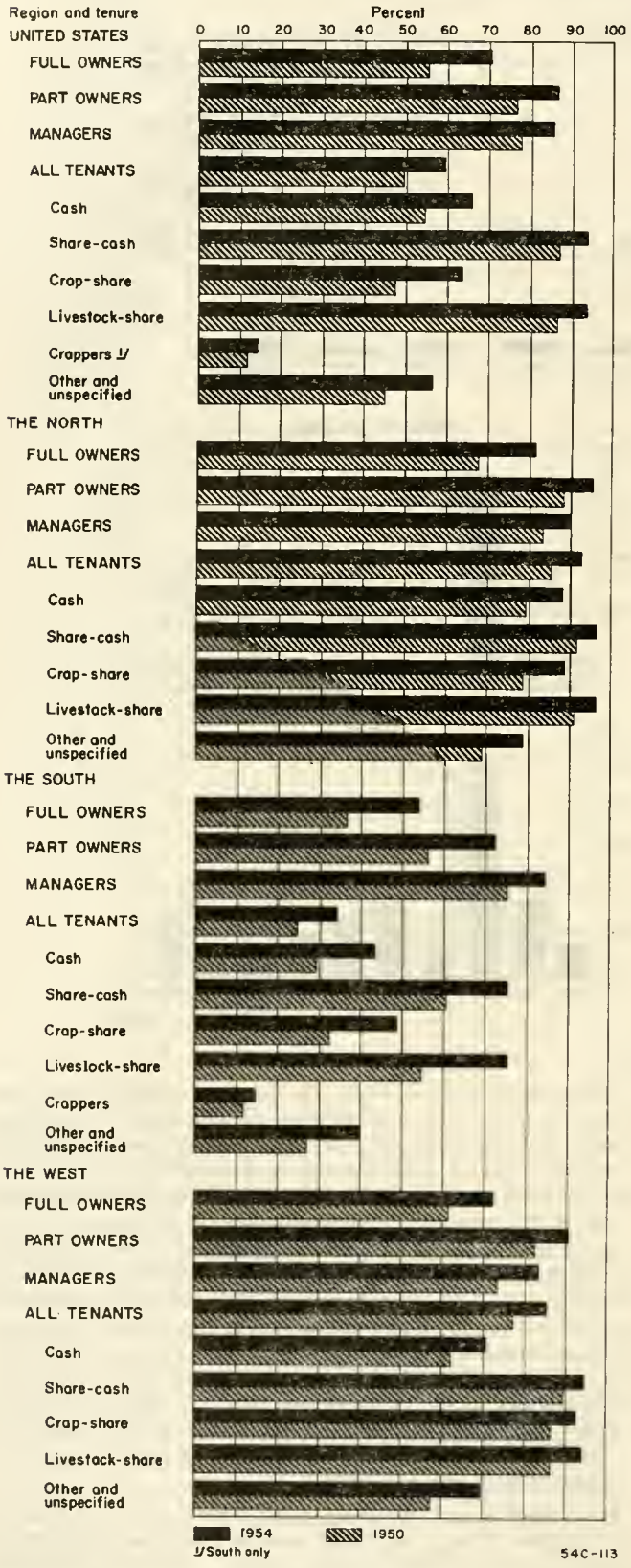


Figure 37.

EQUIPMENT AND FERTILIZER

A dominant characteristic of the recent changes in American agriculture is the rapid mechanization of commercial farms. There have been substantial increases in the number of tractors and also in the number of specialized machines such as pick-up balers, milking machines, and corn pickers. As farm numbers decrease and labor moves out of agriculture, greater farm production is being made possible partly from increased mechanization.

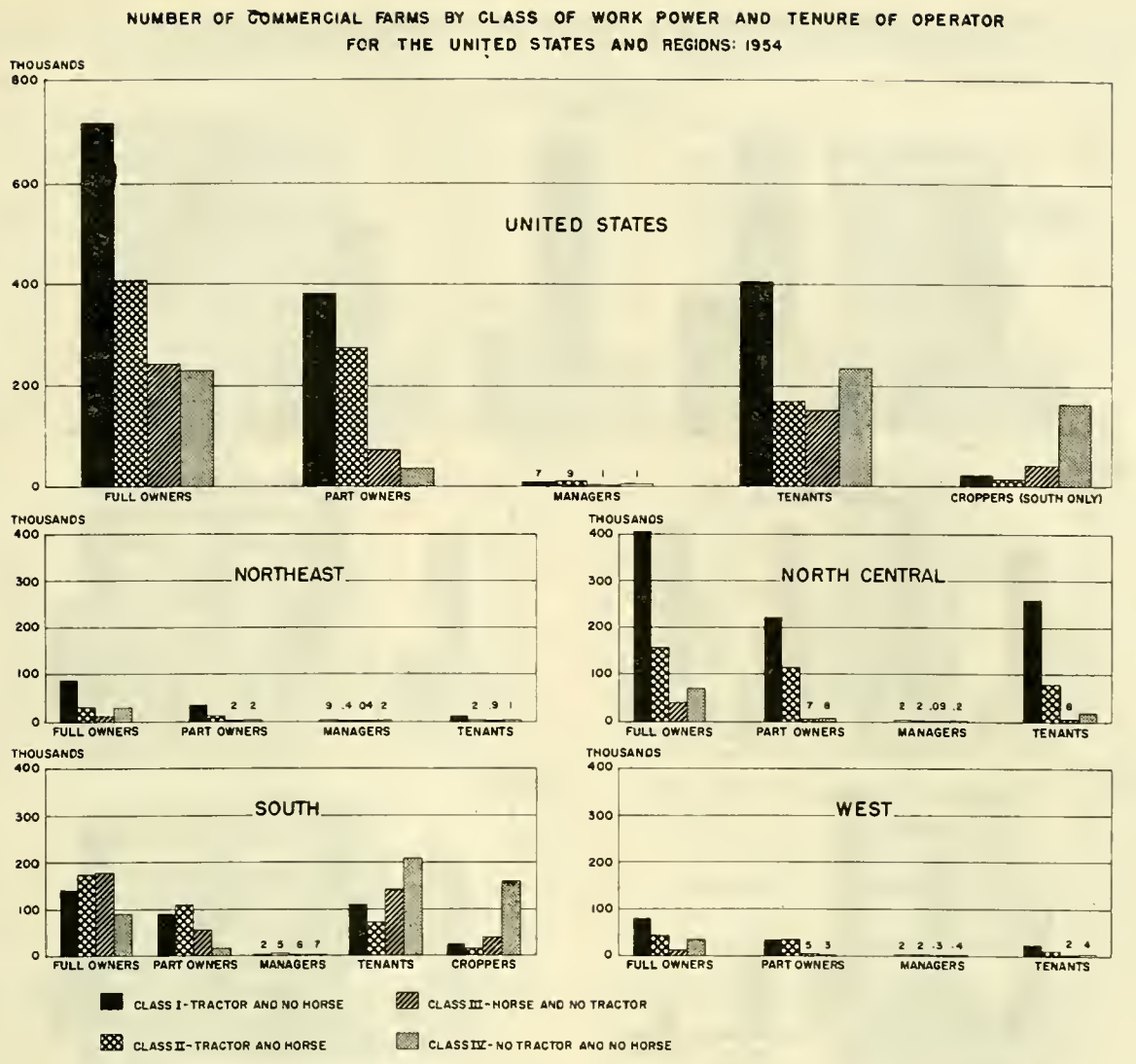
Increase in power.—One index of increased mechanical power applied to agricultural production is the number of tractors. The number of tractors on farms rose from *3,609,281* in 1950 to *4,692,341* in 1954. This *30.0* percent increase in numbers does not represent the only change in work capacity, however, for tractors have increased in horsepower and versatility. Tractor numbers now approximate the number of farms in the United States. Excluding the many small noncommercial units, the ratio of tractors to farms would be approximately 1¼ to 1. The geographic distribution of tractors, however, is not proportional to the number of farm units. (*See* figure 38.) The average number of tractors on commercial farms in the North Central Region, for example, is *1.6*, whereas in the South the average is *0.8* per farm.

Work power and tenure.—Work power, as represented by the percent of farms reporting tractors (figure 37), is related differently by the form of tenure in different regions. In the North *92.6* percent of the commercial tenant farms and *81.6* percent of the commercial full-owner farms reported tractors (other than garden) in 1954. The percent of tenant farms in the West reporting tractors was *85.3*, whereas *72.3* percent of the full-owner farms reported tractors. In the South, however, *34.3* percent of the tenants reported tractors compared with *53.9* percent reported by full owners. The low percent of tractors on southern tenant farms is perhaps partly a function of the relative difference in financial condition of northern and southern tenants. Many tenants in the North are tenants because they consider it is more profitable to invest in machinery and equipment rather than land, whereas a large proportion of tenants in the South do not have sufficient capital to invest in either equipment or land. This condition of relatively limited capital in the South may also account partially for the fact that between 1950 and 1954 the proportion of tenant commercial farms reporting tractors (other than garden) showed an increase of only *38.9* percent in this area, whereas full-owner farms reporting tractors increased *46.5* percent and part-owner farms reporting increased *28.8* percent. To a lesser extent, a similar pattern of increase was reported for the North and the West (figure 37).

Part-owner and manager farms, as may be expected by their tendency to be larger than tenant or owner-operated farms, reported the highest percentage of tractors in 1950 and 1954.

An important contribution to the increase of agricultural production was the substitution of petroleum for feed crops as a source of power. In general, the degree to which this transition has been effected is indicated in a comparison of farms with tractors and no horses or mules and farms with horses or mules and no tractor (figure 38).

Specialized machines.—The percent of farms reporting tractors is an indicator of the extensiveness of mechanization; whereas, the degree of intensity or thoroughness of mechanization may be inferred from the use of specialized machines. Figure 39 shows the percent of commercial farms using some specialized machines in comparison with the percent of farms reporting tractors.


NUMBER OF COMMERCIAL FARMS BY CLASS OF WORK POWER AND TENURE OF OPERATOR
FOR THE UNITED STATES AND REGIONS: 1954
THOUSANDS
UNITED STATES
FULL OWNERS
PART OWNERS
MANAGERS
TENANTS
CROPPERS (SOUTH ONLY)
NORTHEAST
NORTH CENTRAL
SOUTH
WEST
CLASS I - TRACTOR AND NO HORSE
CLASS II - TRACTOR AND HORSE
CLASS III - HORSE AND NO TRACTOR
CLASS IV - NO TRACTOR AND NO HORSE
54C - 143

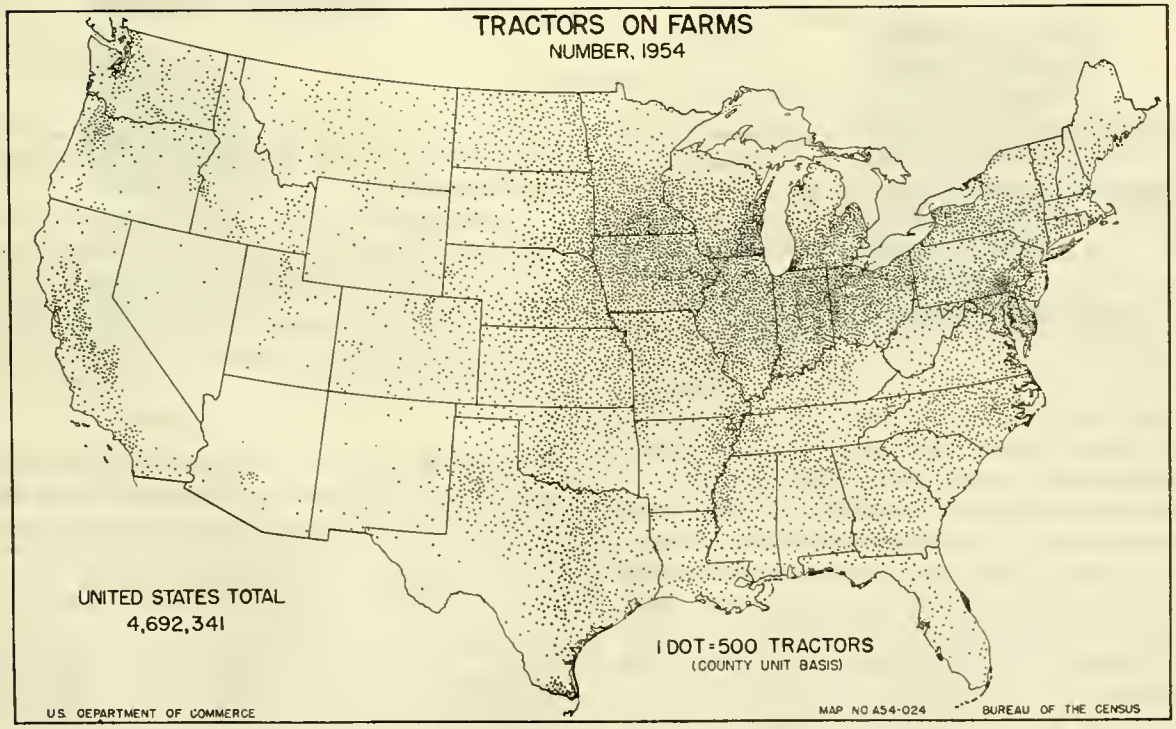

TRACTORS ON FARMS
NUMBER, 1954
UNITED STATES TOTAL
4,692,341
1 DOT = 500 TRACTORS
(COUNTY UNIT BASIS)
U.S. DEPARTMENT OF COMMERCE
MAP NO A54-024
BUREAU OF THE CENSUS

Figure 38.

PERCENT OF COMMERCIAL FARMS REPORTING TRACTORS, COMBINES, MILKING MACHINES, CORN PICKERS AND PICK-UP BALERS, BY TENURE OF OPERATOR; FOR THE UNITED STATES AND REGIONS: 1954

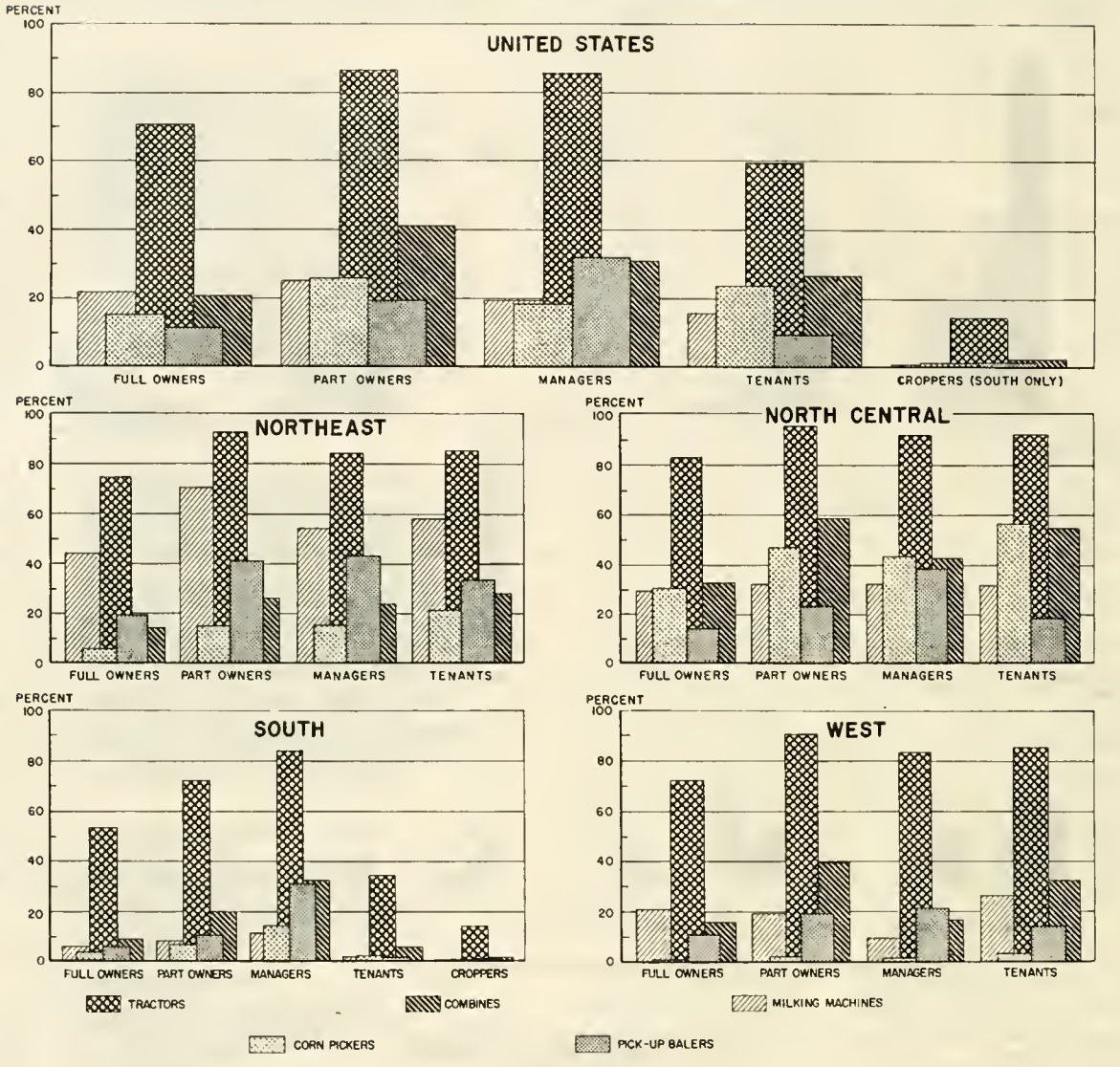


Figure 39.

In 1954, there were *923,709* farms that reported ownership of at least one combine; this represents an increase of *258,331* farms over the number that reported combines in 1950. The number of combines also has increased, rising from *713,633* in 1950 to *979,050* in 1954. The proportion of commercial part-owner farms reporting combines was double that of commercial full-owner farms and greater than that of tenants. Part of this differential may be due to the difference in farm size or kind of farm. Part of the differential also may be due to the superior capital position of part owners. As in the case of tractors, the change in number does not show all of the increased capacity or that, as more combines become self-propelled, they decrease the labor-operator requirements and free tractors for other purposes.

Milking machines were reported on *712,022* farms in 1954. This number of farms represents an increase of *11.9* percent over 1950.

The number of farms reporting corn pickers in 1954 was *676,088* and the number of corn pickers reported was *687,466*. This represents an increase of *228,701* farms and *231,947* corn pickers since 1950. The percentage of both part-owner and tenant-operated farms reporting the use of corn pickers is higher than either full-owner or manager farms. This may be accounted for by the large size and high proportion of cropland in part-owner and tenant farms in the principal corn-producing regions and so does not necessarily imply that tenancy is associated with higher mechanization.

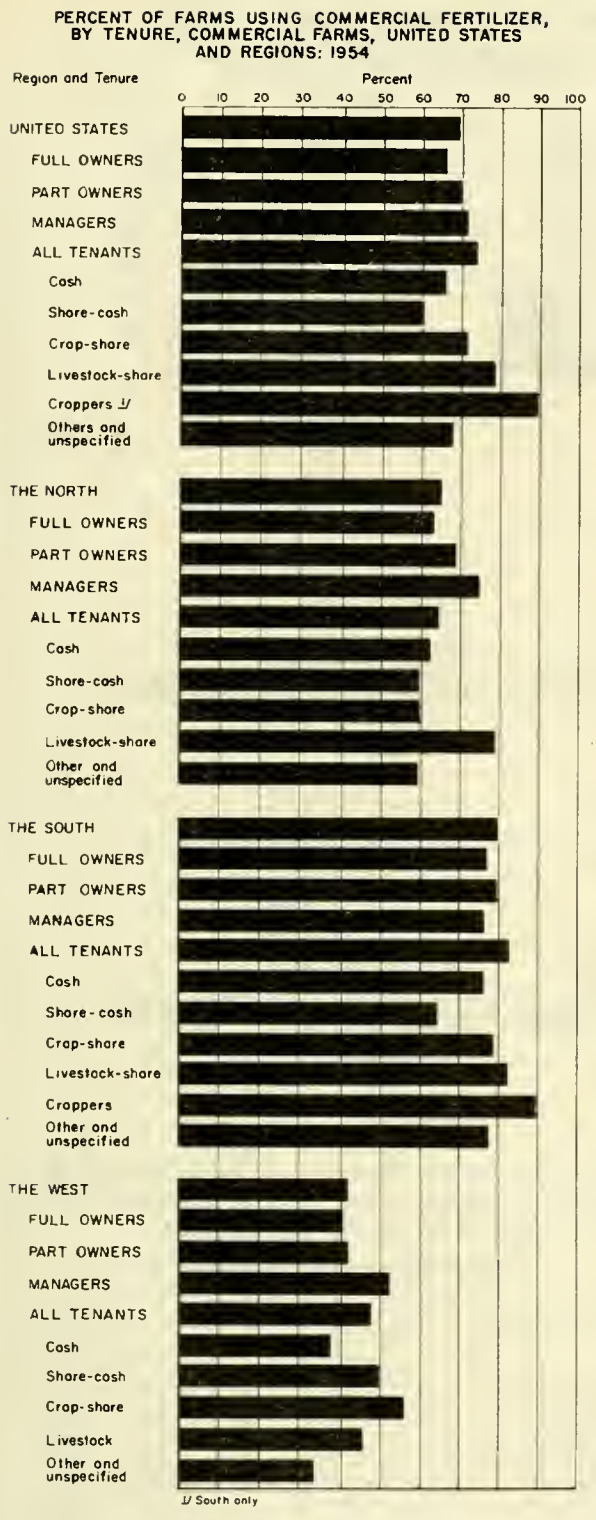
In 1954, *442,872* farms reported balers and *427,279* of these farms were commercial farms. A higher proportion of manager-operated farms reported pick-up balers than any of the other tenures. The widest differentials were found in the South and North Central and were probably associated with greater emphasis on livestock enterprises on manager-operated farms. The number of farms reporting pick-up balers in 1950 was *191,658* and the

(*Continued on page 189*)

TABLE 6.—PERCENT OF COMMERCIAL FARMS REPORTING SPECIFIED EQUIPMENT, BY TENURE OF OPERATOR, UNITED STATES, 1954

[Data are based on reports for only a sample of farms]

Equipment	Commercial farms reporting	Full owners	Part owners	Managers	Tenants
	Percent	*Percent*	*Percent*	*Percent*	*Percent*
Grain combine	26.9	20.5	40.9	30.8	26.6
Milking machine	20.6	21.6	25.1	19.8	15.6
Corn picker	19.9	15.0	25.9	18.4	23.5
Pick-up baler	12.8	11.3	19.5	31.9	9.7



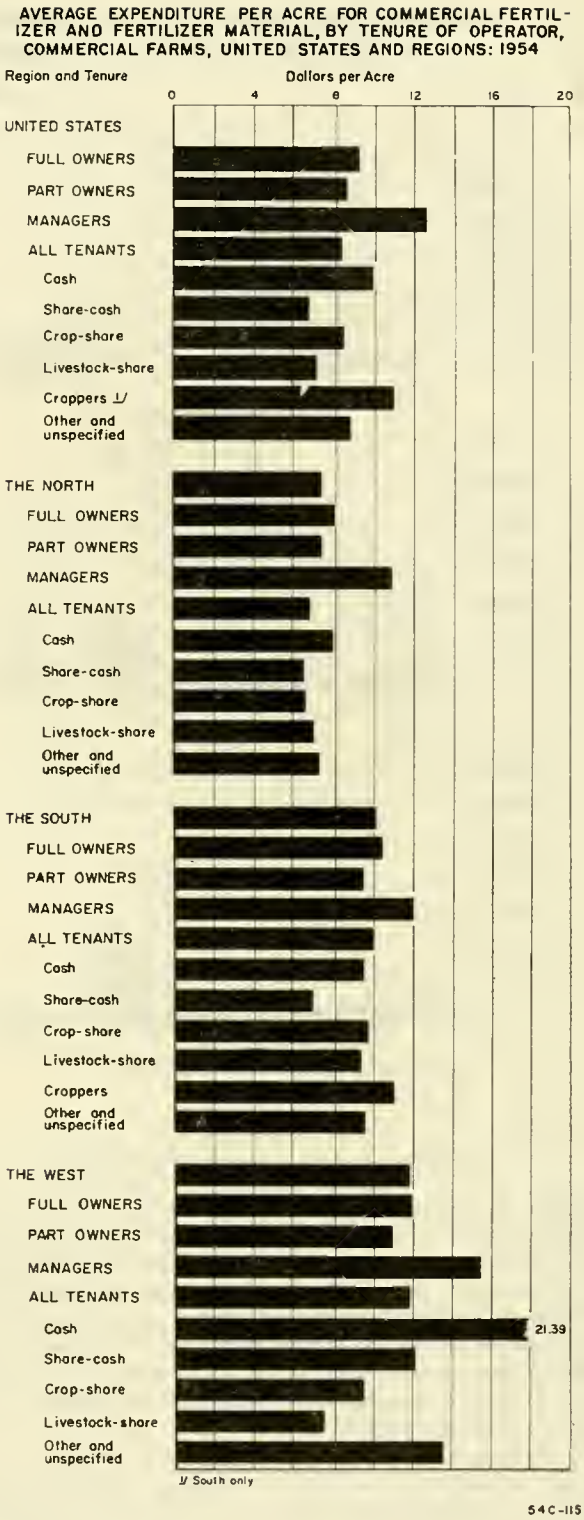


Figure 40.

Fertilizer use and tenure.—The increased use of commercial fertilizer also helps to account for the growth of agricultural production. The use of commercial fertilizer has more than trebled in the period 1940–54. In the United States *17,811,999* tons of fertilizer were purchased in 1954 for use on commercial farms. For those farms reporting fertilizer, the rate of application was *307* pounds per acre. In all three major areas of the United States (figure 40), a higher proportion of tenant farms reported the use of fertilizer than full owners, while croppers showed the highest percentage of all farms. Differences between tenure groups, however, are slight and perhaps could be explained by the differences in type of farm. There are wider differences between areas than between tenure categories.

Leasing arrangements, to the extent that they dissociate costs and returns, may affect resource combinations. A tenant or landlord who bears the full cost of fertilizer and receives only a share of the increased productivity, will tend to apply less fertilizer, than if the costs were also shared per acre. In 1954, commercial cash tenants spent an average of *$9.97* per acre for commercial fertilizer and crop-share tenants spent *$8.39* per acre. To a certain extent the larger expenditure by cash tenants may be because, in the short run, the cash tenant receives all of the return resulting from increased production.

(*Continued on page 190*)

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AVERAGE EXPENDITURE PER COMMERCIAL FARM FOR SPECIFIED COST ITEMS, BY TENURE OF OPERATOR, FOR THE UNITED STATES AND REGIONS: 1954

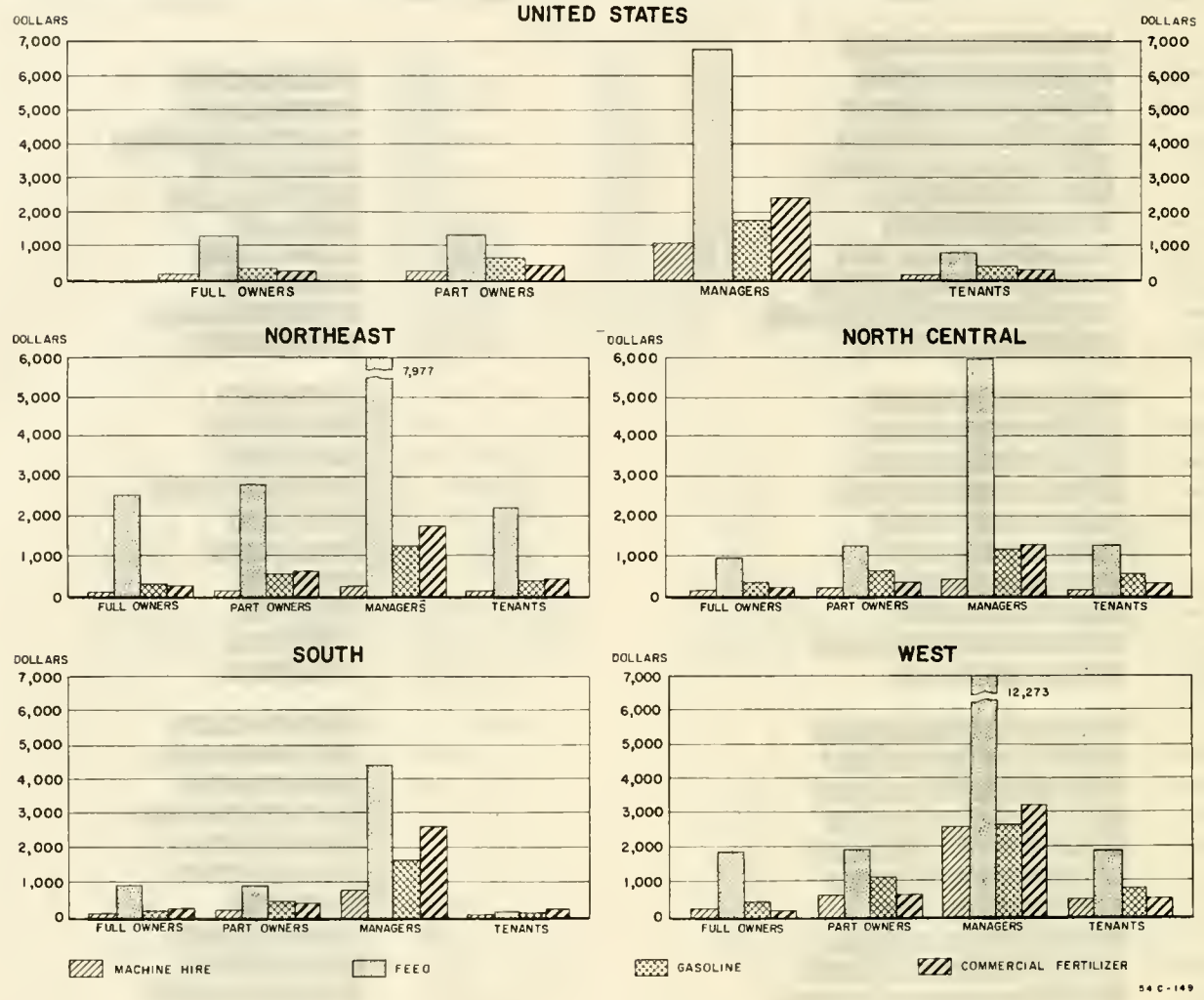


Figure 41.

SPECIFIED FARM EXPENDITURES

Changes in costs.—As farms continue to increase in size and total agricultural production continues to increase, expenditures become more important to the individual farm and to the agricultural industry. In addition to the general increases in costs attendant to increased production, there have been shifts in combination of production factors which have changed the composition of farm costs. Many of these changes in farm expenditures have been accompanied by adjustments in tenure arrangements or even in the form of tenure.

One important shift in the production pattern influencing the structure of costs has been the substitution of working capital for labor. In general, there has been an increase of capital and a decrease of labor, in physical terms, per acre of farmland. For example, machine hire on commercial farms increased from *$579 million* in 1949 to *$603 million* in 1954 and expenditures for gasoline and petroleum increased from *$1,091 million* in 1949 to *$1,312 million* in 1954, while hired labor costs decreased from *$2,336 million* in 1949 to *$2,216 million* in 1954.

Both the form of tenure and the conditions of a particular tenure arrangement may be affected by the type and level of farm expenditures. Owner-operatorship might be the most efficient tenure form if, for example, relatively large expenditures are required from the operator for repair of fences, buildings, or

(Continued on page 190)

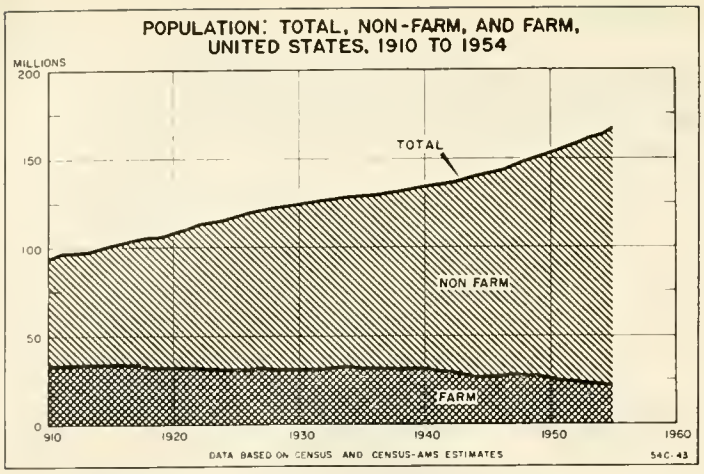
TABLE 7.—AVERAGE EXPENDITURE PER COMMERCIAL FARM REPORTING SPECIFIED COST ITEMS, BY TENURE OF OPERATOR, FOR THE UNITED STATES AND REGIONS: 1954

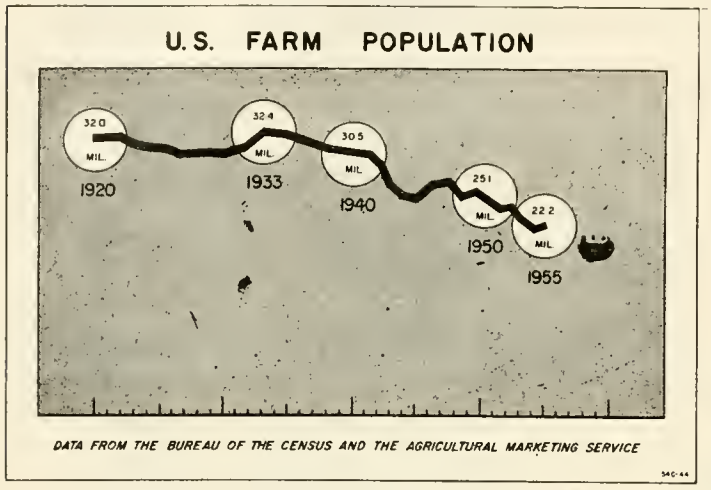
[Data are based on reports for only a sample of farms]

Specified expenditure and area	All commercial farms	Full owners	Part owners	Managers	Tenants
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*
Machine hire:					
United States	291	244	391	2,055	258
Northeast	218	198	254	501	253
North Central	246	213	289	744	258
South	259	226	383	1,570	210
West	764	502	1,059	5,301	868
Feed:					
United States	1,444	1,482	1,550	9,256	1,092
Northeast	3,059	3,018	3,138	10,044	2,576
North Central	1,291	1,127	1,387	7,277	1,438
South	981	1,158	1,156	5,895	410
West	2,959	2,785	2,652	21,598	2,864
Gasoline and other petroleum products:					
United States	492	380	686	1,899	472
Northeast	432	359	607	1,373	448
North Central	511	384	664	1,254	571
South	395	331	580	1,862	303
West	778	513	1,149	2,895	862
Commercial fertilizer:					
United States	446	363	633	3,360	379
Northeast	525	414	733	2,078	589
North Central	430	331	536	1,703	488
South	389	358	582	3,475	283
West	971	516	1,518	6,205	1,116

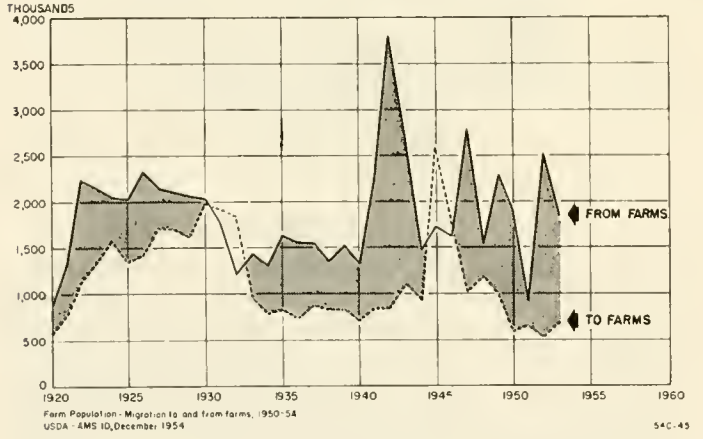
SECTION III

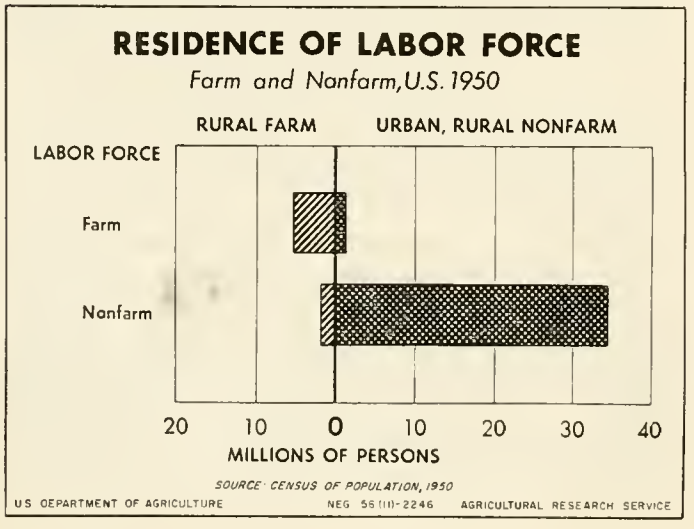
People



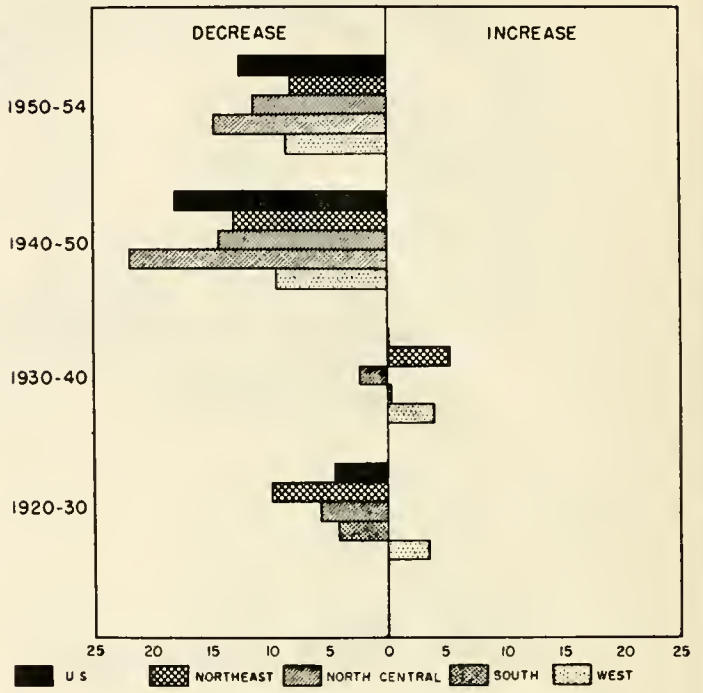


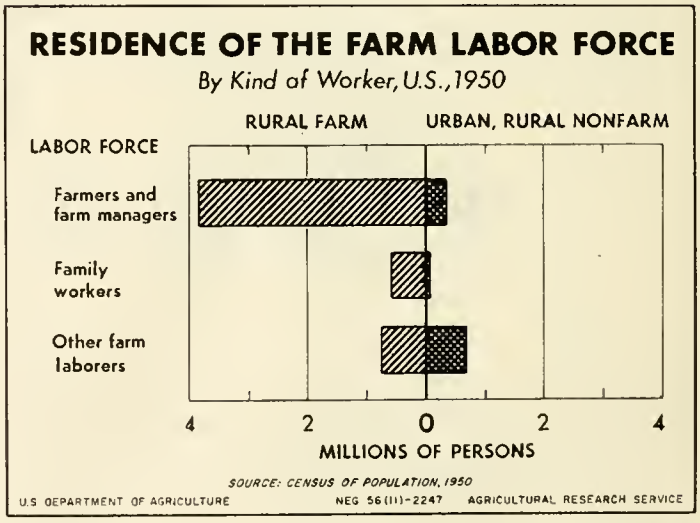
MIGRATION TO AND FROM FARMS, U.S. 1920-53

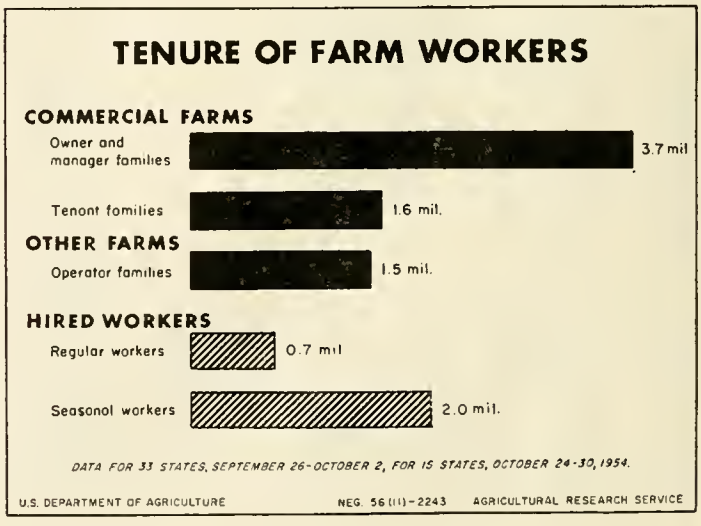




PERCENTAGE CHANGE IN THE FARM POPULATION, SELECTED PERIODS, UNITED STATES AND REGIONS, 1920-54







← Figure 42. ↑

PEOPLE

The implications of farm tenure extend through the entire framework of human relationships associated with the use of farm land. Tenure deals with the rights, privileges, and responsibilities of all persons participating in agricultural production, and in the allocation of the returns to the participants. It is also concerned with the alternative economic and social considerations which influence the participants in their tenure relations. Farm tenure, in its broad sense, is the social structure under which our agricultural resources are utilized. This section of this report deals with farm tenure in its relation to farm people.

FARM POPULATION

The tenure of the farm population is only partially reflected by the tenure under which farms are operated. In addition to farm operators and their families, the farm population includes some farm laborers and other families who live on farms but do not operate them. A few farm operators, on the other hand, do not live on farms. Also, the livelihood of many farm families is only partially or secondarily dependent on agriculture.

The farm population increased along with total population until about World War I, reaching a peak of 32,530,000 persons in 1916, according to estimates of the Bureau of the Census. At that time, there was about one person on farms for each two persons in the nonfarm population. Since 1916, the trend in the number of persons on farms has been generally downward with only 21,890,000 on farms in 1954, or approximately 1 person on farms for each 6 not on farms.

Migration, both from and to farms, has been large with an average from 1920 to 1954 of about one person in each 16 of the farm population each year moving from farm to nonfarm, and one in 25 moving from nonfarm to farm, according to estimates of the Agricultural Marketing Service of the United States Department of Agriculture. The net migration from farms has exceeded the natural increase (excess of births over deaths) by approximately 300,000 persons per year.

This physical movement of persons from and to farms accompanied an even larger movement between farm and nonfarm employment. Many farm persons who take nonfarm jobs do not move away from the farm, and many who move to the farm do not give up their nonfarm employment.

Tenure of the farm population.—In considering tenure of the farm population, we must take into account the large proportion of the farm population primarily and secondarily dependent on nonfarm employment or income. For many farm residents, the farm serves principally as a place of residence rather than a means of livelihood.

The tenure of the farm population is reflected in the tenure of the work force represented in the farm population. According to the 1950 Census of Population, 6,933,405 of those persons classified by residence as rural farm were in the labor force on April 1, 1950. Of these 5,174,657, or 74.6 percent, were in the farm labor force and 1,758,748 were in the nonfarm labor force. An additional 1,056,064 persons in the farm labor force were urban or rural nonfarm residents.

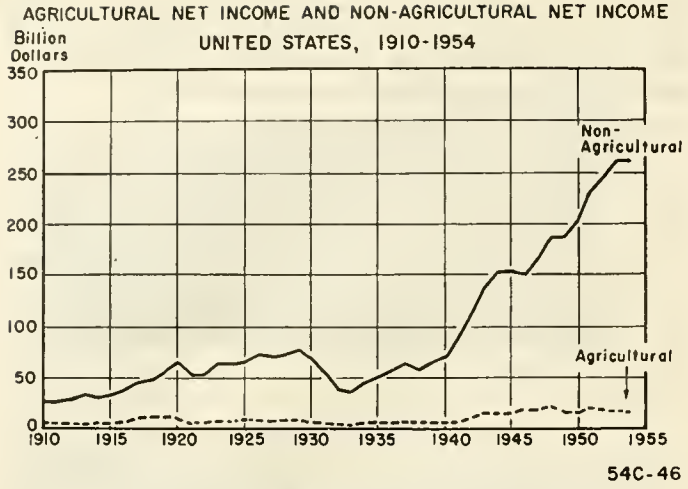
Of the 5,174,657 persons in the farm-labor force residing on rural farms, 3,853,395 were classed as farmers and farm managers; 554,549, as unpaid family workers; and 766,713, other farm workers and foremen. These other farm workers and foremen were made up almost entirely of hired farm workers. These rural farm residents in the farm-labor force represented 82.8 percent of the total farm-labor force on April 1, 1956.

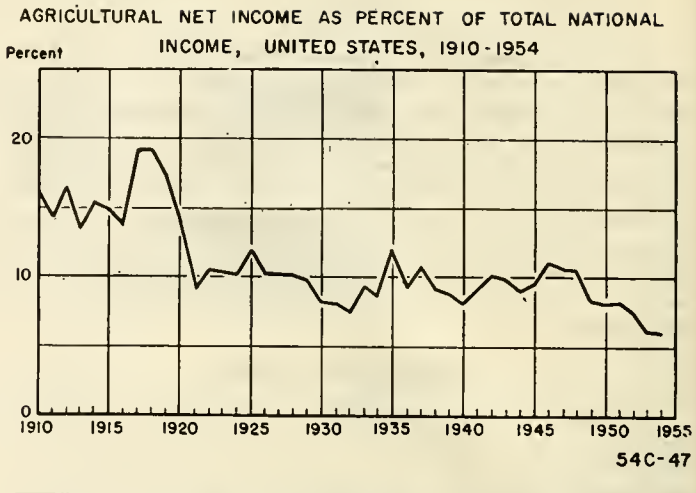
Rural farm residents, however, do not account for the entire farm-labor force. Urban residents accounted for 117,238 of the farmers and farm managers classified in the 1950 Census of Population and rural nonfarm residents accounted for an additional 232,550 farmers and farm managers. These farmers and farm managers, who were nonfarm residents, accounted for 8.3 percent of the total. A slightly smaller proportion (7.5 percent) of the family workers on farms were nonfarm residents. Nearly half (47.1 percent) of the hired farm workers were nonfarm residents.

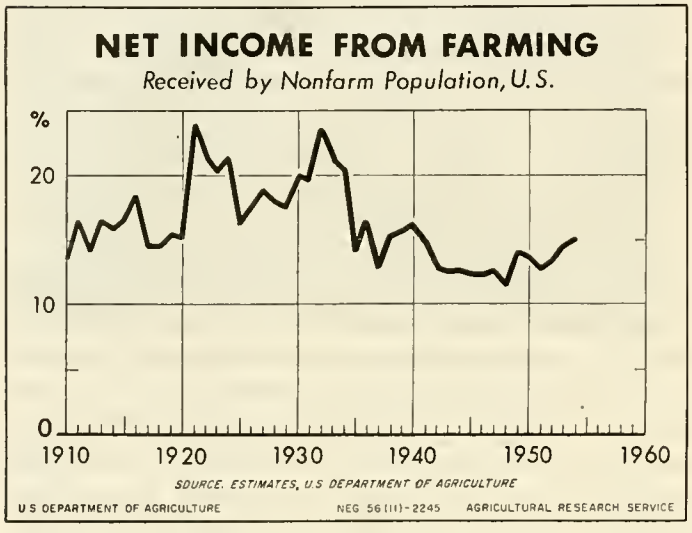
The tenure situation of farm people is also reflected by the tenure of farm workers as reported in the 1954 Census of Agriculture. In 1954, there were *9,597,343* persons reported as working on farms during specified week (September 26–October 2 for 33 States and October 24–30 for 15 States). Of these workers, *4,142,352* were farm operators, *2,725,341* were unpaid family workers, and *2,729,650* were hired workers. If the family is considered as a unit, a farm operator and unpaid members of his family may be grouped. Thus, we can consider both farm operators and unpaid members of their families on the basis of the tenure of the farm operator. A further classification is provided by the segregation of farms other than commercial. These other, or noncommercial farms, account to a large extent for those farms which serve primarily as a place of residence.

Of the *9,597,343* farm workers reported in the 1954 Census, *3,685,341* were farm owners or managers of commercial farms and unpaid members of their families; *1,637,446* were tenant farm operators of commercial farms and unpaid members of their families; *1,544,906* were operators of noncommercial farms and members of their families; and *2,729,650* were hired farm workers. Of the hired workers, however, about *one-fourth* (*25.3* percent) were regular workers employed 150 or more days during the year and *three-fourths* (*74.7* percent) were seasonal workers. The specified week was a period of near peak employment in many areas. Of the *1,544,906* unpaid family workers (including operators) on noncommercial farms, most were owner-operators and members of owner-operator families. Probably little more than one in eight were tenant operators and members of tenant-operator families.

The number of farm owners has remained relatively unchanged since 1910 (*see* Number of Farms by Tenure in section I) except about 1930 when substantial numbers of owners were unable to maintain an equity in their farms, and in 1954 when, due primarily to consolidation of farms into larger operating units, there was a sharp drop in the total number of farms. The number of tenants increased from 1910 until 1935, then declined. In 1954, there were only 40.8 percent as many tenants as in 1935. The proportion of tenancy declined from 42.4 percent in 1935 to 24.4 percent in 1954. According to estimates of the Agricultural Marketing Service, United States Department of Agriculture, the annual average number of hired farm workers remained relatively constant from 1910 to 1929, at about 3.4 million persons and at 25 percent of the average number of all farm workers. (*See* Farm Labor in section II.) Since 1929, the average number of hired farm workers has declined, with an average of 1.9 million hired farm workers in 1954 representing 22.8 percent of the average number of all farm workers in 1954.







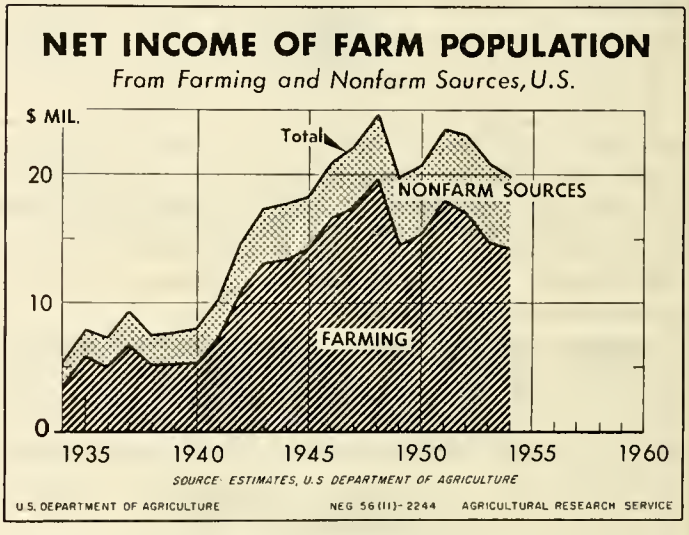


Figure 43.

FARM INCOME AND TENURE

The 1954 net income originating from agriculture was more than three times that of 1910 according to estimates of the Agricultural Marketing Service of the United States Department of Agriculture. The number of persons employed in agriculture in 1954, on the other hand, was less than two-thirds the 1910 farm employment.

This agricultural net income includes more than the net income of farm operators from farming. It also includes wages for farm labor, net farm rents, and interest on farm-mortgage debt. Most, but not all, of the total agricultural net income of farm operators from farming goes to farm residents. But nearly one-half of farm wages, about two-thirds of the net farm rents, and practically all of the interest on farm-mortgage debts goes to nonfarm residents. In 1954, 15.1 percent of the total agricultural net income went to nonfarm residents.

The income of farm residents, on the other hand, is not limited to income from agriculture. Many persons living on farms receive income from nonfarm sources. In 1954, according to estimates of the Agricultural Marketing Service of the United States Department of Agriculture, 28.5 percent of the net income of the farm population was from nonfarm sources.

Tenure arrangements, in respect to rights in the use of farm lands and in the division of income from land, are influenced by the whole economy, nonfarm as well as farm. For example, farm tenants who receive much of their income from nonfarm sources may rent the farm primarily as a place to live rather than as a source of livelihood. In bargaining for the use of the farm, its value as a residence may be preeminent in the consideration of the would-be tenant. The landlord may consider its rent potential from agricultural use as well as residential use. The agricultural possibilities of many of these places, however, are very limited resulting in paramount consideration being given to their residential potential by both tenants and landlords.

Distribution of farm income by tenure.—In the 1954 Census of Agriculture, *69.6* percent of the farms were classed as commercial. The remaining *30.4* percent, consisting principally of part-time and residential farms, account for a high proportion of the farm population dependent primarily on income from nonfarm sources. The tenure of these noncommercial farms is determined in large part by considerations other than the farm as a business enterprise. For the most part, they are owner-operated with only *13.0* percent tenancy as compared with *28.8* percent tenancy for commercial farms. A high proportion of the tenants on these noncommercial farms pay cash rent or payments other than share of crops or livestock.

For commercial farms, the tenure distributions vary by income. In general, the higher the gross farm income the lower the percentage of farms in that income group operated by full owners. The opposite holds for part owners. The proportion of part-owner farms represented in the lower economic classes is low but this ratio increases with each higher economic class of farm. The proportion of farms operated by managers, also, increases with increases in the gross farm income. For tenants, the proportion of tenancy is lower for both the lowest and highest economic classes than for the intermediate classes. Of Class VI farms, the lowest economic class of commercial farms in respect to gross income, *63.6* percent were operated by full owners; *11.5* percent, by part owners; *0.1* percent, by managers; and *24.8* per-

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PERCENT DISTRIBUTION OF COMMERCIAL FARMS IN EACH ECONOMIC CLASS, BY TENURE OF OPERATOR, FOR THE UNITED STATES AND REGIONS: 1954

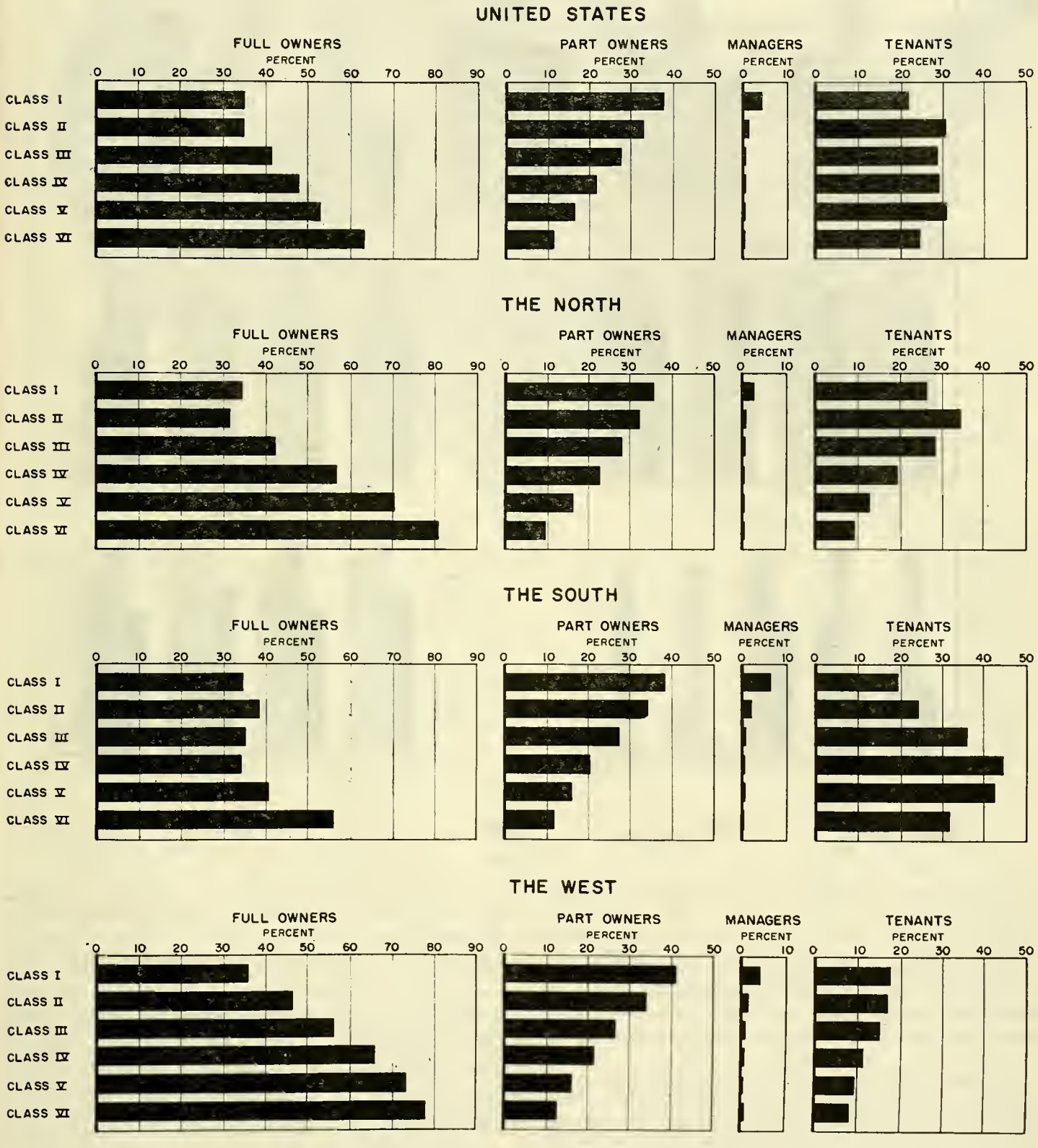

Figure 44.

PERCENT OF COMMERCIAL FARMS IN EACH TENURE GROUP REPORTING A TELEPHONE, ELECTRICITY, AND RUNNING WATER, FOR THE UNITED STATES AND REGIONS: 1954

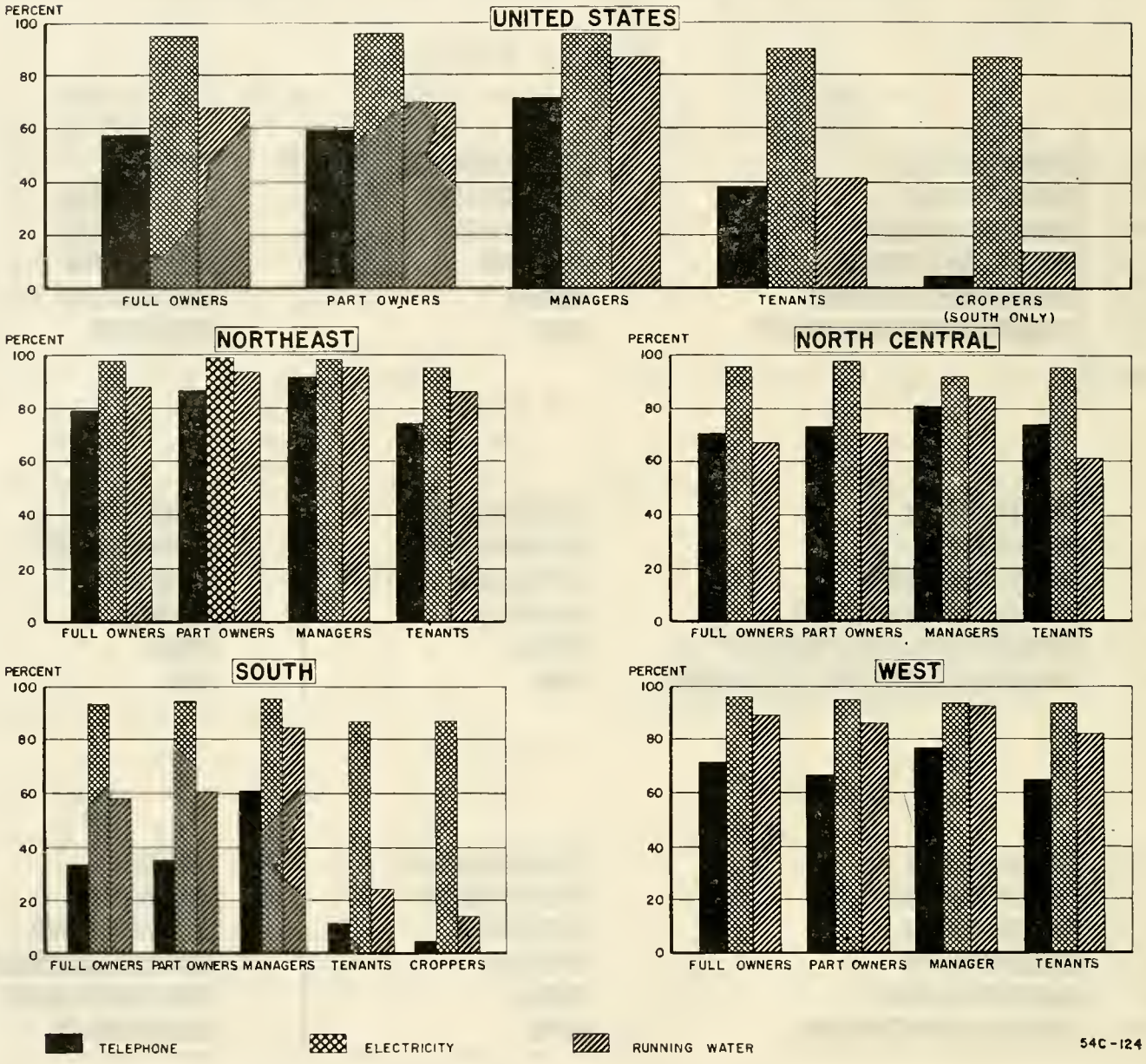

Figure 45.

Specified facilities on farms by tenure of operator.—Income in terms of the well-being of the population is reflected by the facilities in the dwelling. In the 1954 Census of Agriculture, electricity was reported on *93.0* percent of the farms, telephone on *48.8* percent, and running water on *58.8* percent. For commercial farms, the ratios were *93.8* percent reporting electricity, *52.5* percent telephone, and *60.8* percent running water, as compared with *91.2*, *40.3*, and *54.0* percent, respectively, for noncommercial farms.

The proportion of farms reporting each of these specified facilities was generally less for tenants than for owners. This difference was less pronounced for electricity than for telephone or running water, and less in the North and West than in the South. In the North and West, nearly as high a proportion of tenants as owners reported electricity. In the North Central region as high a proportion of tenants reported electricity as full owners. For this region, the proportion of tenants reporting telephones was higher than for either full owners or part owners.

In the South, the proportion of farms reporting each of these specified facilities was much less than for other regions and the difference between tenants and owners was more pronounced. The proportion of farms reporting telephone and running water, respectively, was much lower for tenants than for owners, and much lower for croppers than for other tenants. In the South, *4.3* percent of the croppers and *11.3* percent of all tenants on commercial farms reported telephone as compared with *33.4* percent of the full owners and *35.1* percent of the part owners. Running water was reported by *13.9* percent of the croppers and *24.1* percent of all tenants on commercial farms, as compared with *58.1* percent for full owners and *60.2* percent for part owners. The proportion of croppers reporting electricity was as high as that for tenants other than croppers, and the difference in the proportion of tenants reporting electricity and owners reporting electricity was much less than for either telephone or running water. The proportion of all tenants reporting electricity was *86.6* percent as compared with *93.1* percent for full owners and *94.5* percent for part owners.

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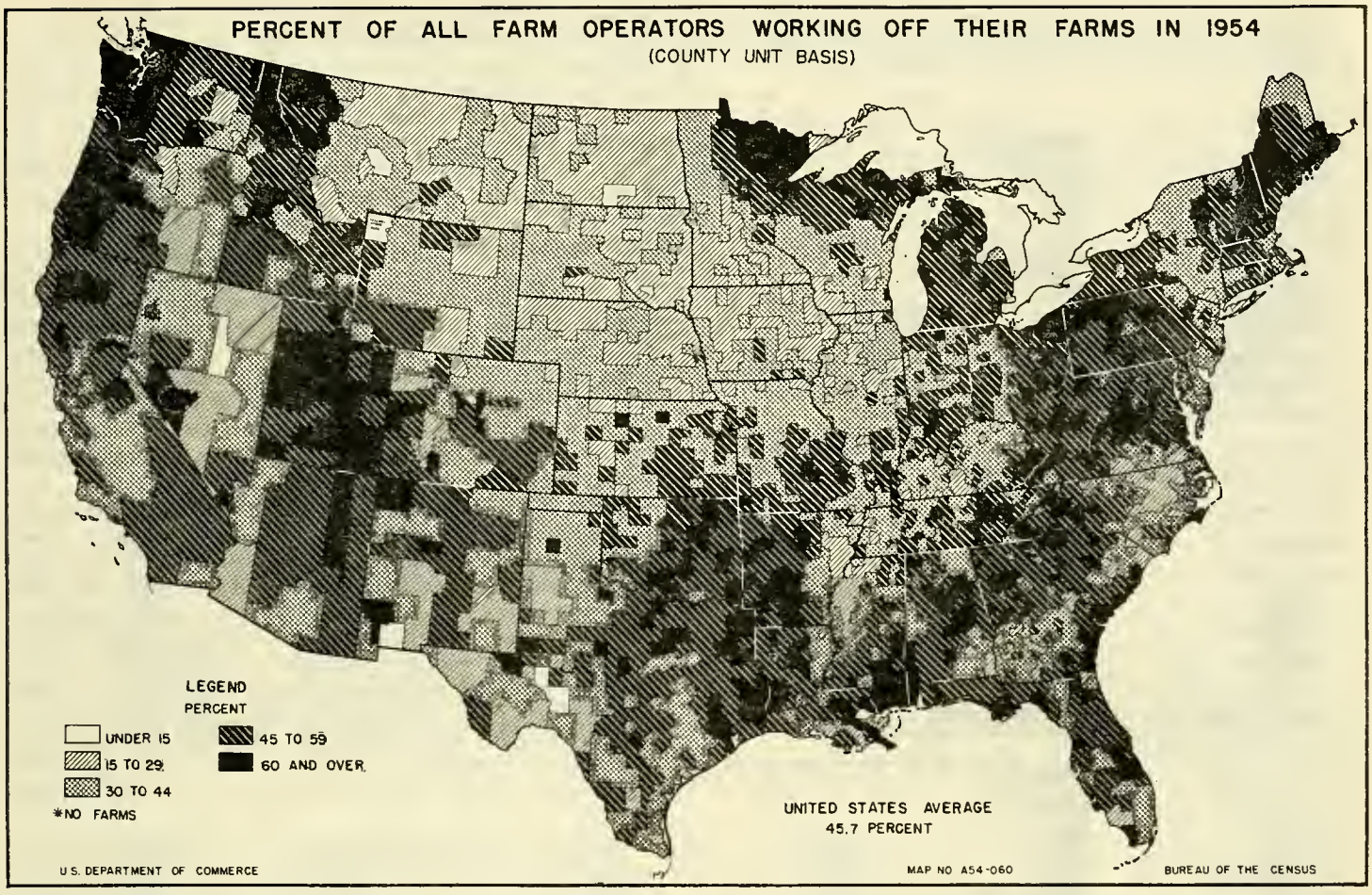
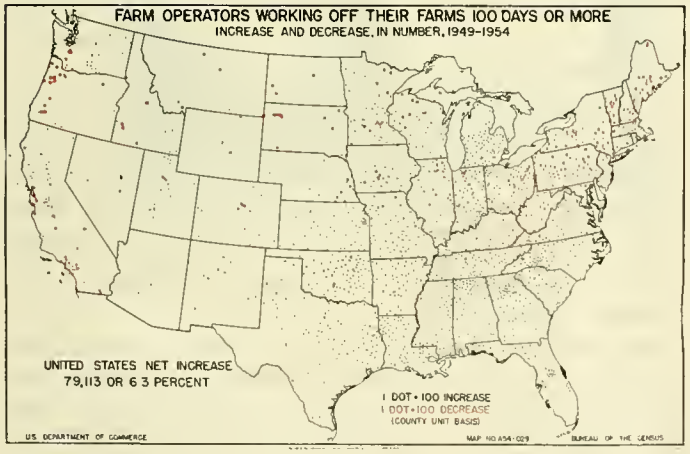




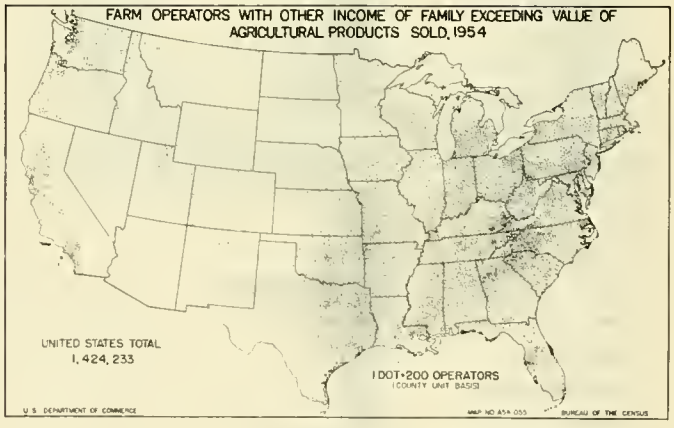


Figure 46.

OFF-FARM EMPLOYMENT AND PART-TIME FARMING

In the 1954 Census of Agriculture, *60.7* percent of the farm operators reported that they or some member of their family living with them received income from sources other than from the farm operated. Of all farm operators, *27.9* percent reported working off their farms 100 or more days during the year, and *29.8* percent reported other income of the family greater than value of farm products sold from the farm operated.

Considerations in the tenure arrangements of these farm operators, partially or primarily dependent on other employment or other income, are quite different from those of operators wholly or primarily dependent on agriculture.

Farm operators with other employment and other income include: (*1*) Farmers who work at nonfarm jobs during slack seasons; (*2*) farmers who supplement their farming with part-time work off the farm; (*3*) persons, employed full time at nonfarm jobs, who live in rural areas convenient to their place of employment and have sufficient agricultural production to qualify as farms; and (*4*) persons, both farm and nonfarm, who retire on the land and augment their retirement income with some agricultural activity.

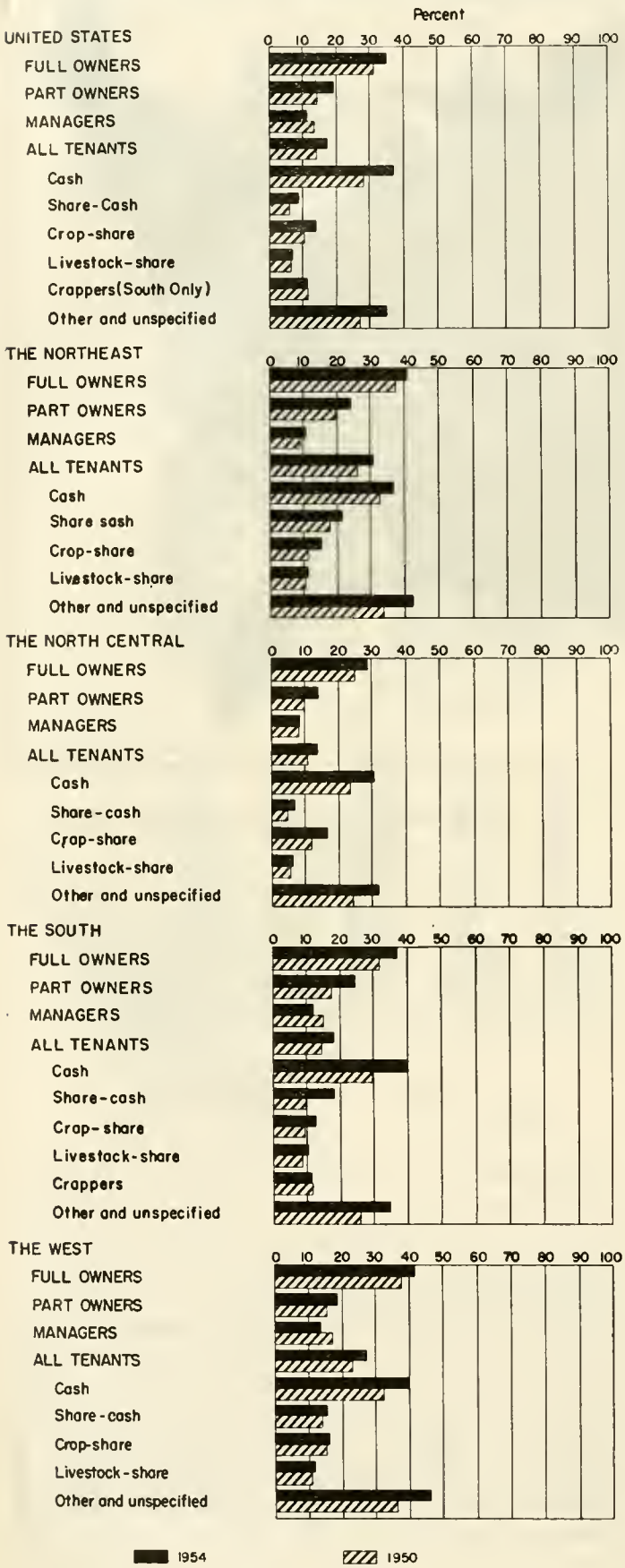


Figure 47. 54C-131

Tenure and off-farm work.—Only *one-third* (*32.5* percent) of the farms operated by persons working off their farms 100 or more days were classed as commercial farms in the 1954 Census. The farms of most operators working off their farms 100 or more days were primarily places of residence. The gross sales of farm products were generally small. The operators of only *13.0* percent of all commercial farms reported 100 or more days of off-farm work as compared with *61.8* percent for farms other than commercial.

A large majority of operators working off their farms 100 or more days were owner operators, mostly full owners. Full owners accounted for *72.3* percent of the total; part owners, *12.6* percent; tenants, *14.9* percent; and managers, *0.2* percent. The full owners working 100 or more days off their farms accounted for more than *one-third* (*35.1* percent) of all owner operators. Part owners reporting 100 or more days of off-farm work comprised *one-fifth* (*19.3* percent) of all part owners, and tenants who worked off their farms 100 or more days represented *one-sixth* (*17.3* percent) of all tenants.

Among the tenant groups, cash tenants and other and unspecified tenants reported nonfarm work in about the same proportion as full owners. Possibly this higher proportion of cash and other tenants reporting off-farm work was due to the large number of persons with nonfarm jobs who were renting dwellings primarily. A smaller proportion of share-cash and share tenants reported off-farm work than cash or other and unspecified tenants. The percentage of livestock-share tenants reporting off-farm work was smaller than that for any other tenure group, with *7.1* percent reporting 100 or more days of work off the farm. This small percentage of livestock-share tenants working off their farms may have been due to the work requirements of their livestock enterprises.

Other income.—The number of farm operators with other income greater than their gross income from the operation of their farms overlaps, to a considerable extent, the number of operators who work a considerable portion of the year at jobs off their farms. As might be expected, therefore, the distributions of the two groups are quite similar.

The proportion of farm operators reporting other income varied considerably among the tenure groups. Most of the operators reporting other income were full owners. Nearly *two-fifths* of all the full owners (*39.0* percent) reported other income greater than the value of sales of products from the farm operated. These full owners accounted for nearly *three-fourths* of all full-owner operators (*73.2* percent) of farms other than commercial farms and *one-seventh* of the full-owner operators (*14.4* percent) of commercial farms.

The percentages of part owners and of tenants with other income exceeding sale of agricultural products were less than *one-half* that of full owners. There was considerable variation, however, among the tenant subclasses. The proportions of cash tenants and other and unspecified tenants with other income exceeding sales of products from the farm operated were similar to that of full owners. Very few livestock-share (*4.9* percent) and share-cash tenants (*6.1* percent) reported other income greater than sales of agricultural products. A somewhat higher proportion of crop-share tenants and croppers reported other income with *12.9* and *11.2* percent, respectively, reporting other income greater than sales of farm products.

PERCENT OF FARM OPERATORS WITH OTHER INCOME OF FAMILY EXCEEDING THE VALUE OF FARM PRODUCTS SOLD, BY TENURE, FOR THE UNITED STATES AND REGIONS: 1950 AND 1954

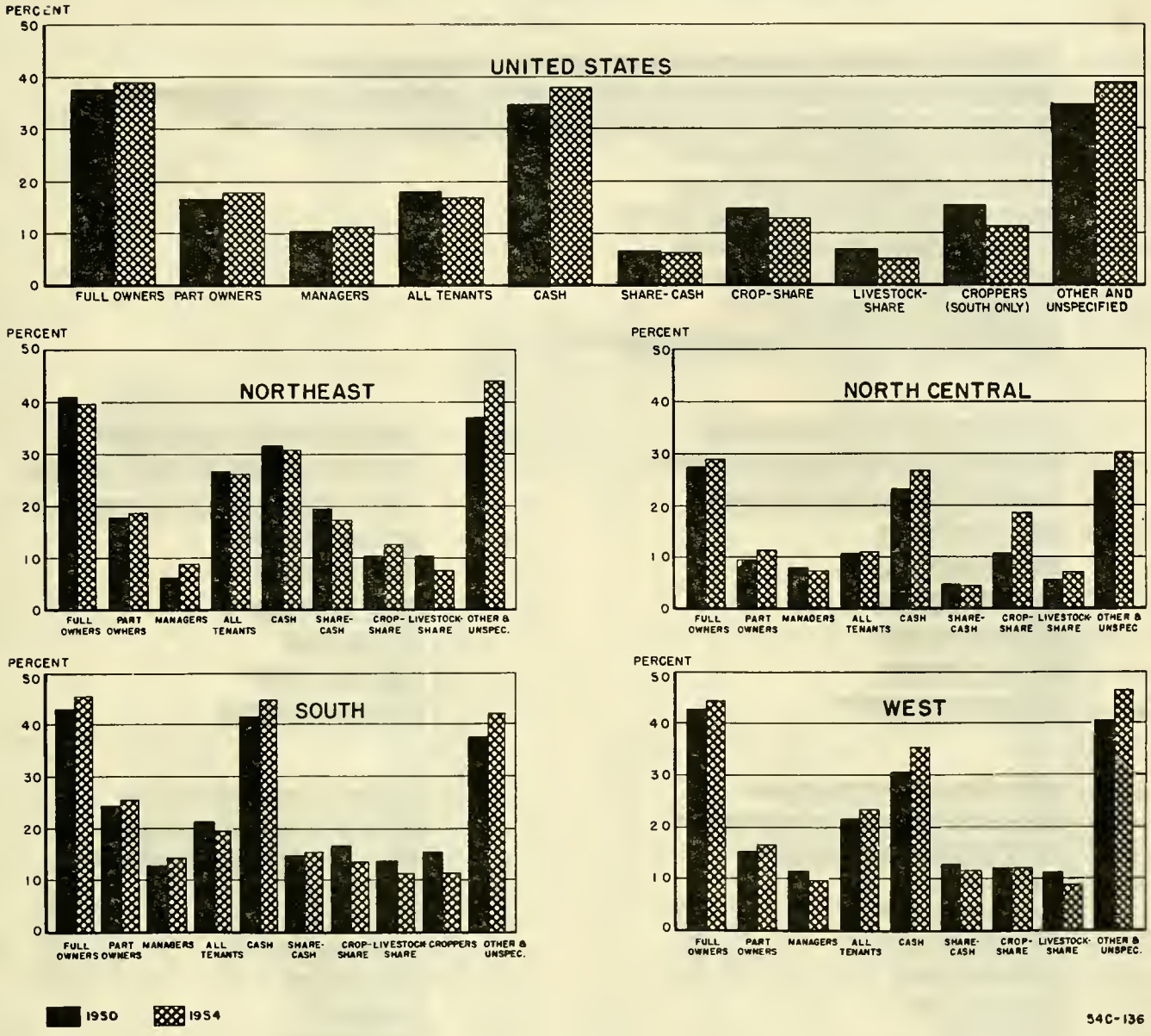


Figure 48.

AVERAGE NUMBER OF YEARS ON PRESENT FARMS, BY TENURE OF OPERATOR, FOR THE UNITED STATES AND REGIONS: 1954 AND 1950

Figure 49.

OCCUPANCY, MOBILITY, AND LENGTH OF TENURE

Average number of years on present farm.—Farm operators in the United States at the time of the 1954 Census had been on their farms an average of 14 years. At the 1950 and 1945 Censuses, farm operators had occupied their farms an average of 13 years, and at the 1940 Census 12 years. The average period of occupancy was slightly higher in the Northeast and North Central regions than in the South and West. Owner operators, on an average, had occupied their farms more than twice as long as tenants. In 1954, owner operators had occupied their present farms an average of 16 years as compared with 7 years for tenants.

Much of this difference may be explained by the differential in age of owners and tenants. In 1954, owners averaged 9.8 years older than tenants. Among the younger farm operators, tenants outnumber owners; among the older operators, owners predominate. (*See* "Age and Residence of Farm Operators," this section.) Tracing each age group of farm operators through successive Censuses, for which tenure data are available by age of operator, shows that the proportion of tenancy has consistently decreased with increases in age. The percentage of tenancy in the higher age groups is small (*9.3* percent for farm operators 65 years old and over in 1954). Most tenants move to the ranks of farm owners or cease to operate farms by the time they reach the higher age groups. For owners who were formerly tenants on the farm now occupied, years of occupancy of the present farm include their years of occupancy as tenant.

Generally, full owners had occupied their farms longer than part owners, although in the West part owners averaged slightly longer periods of occupancy than full owners. This longer period

PERCENT DISTRIBUTION OF FARM OPERATORS IN EACH TENURE, BY YEARS ON PRESENT FARMS, FOR THE UNITED STATES AND REGIONS: 1954

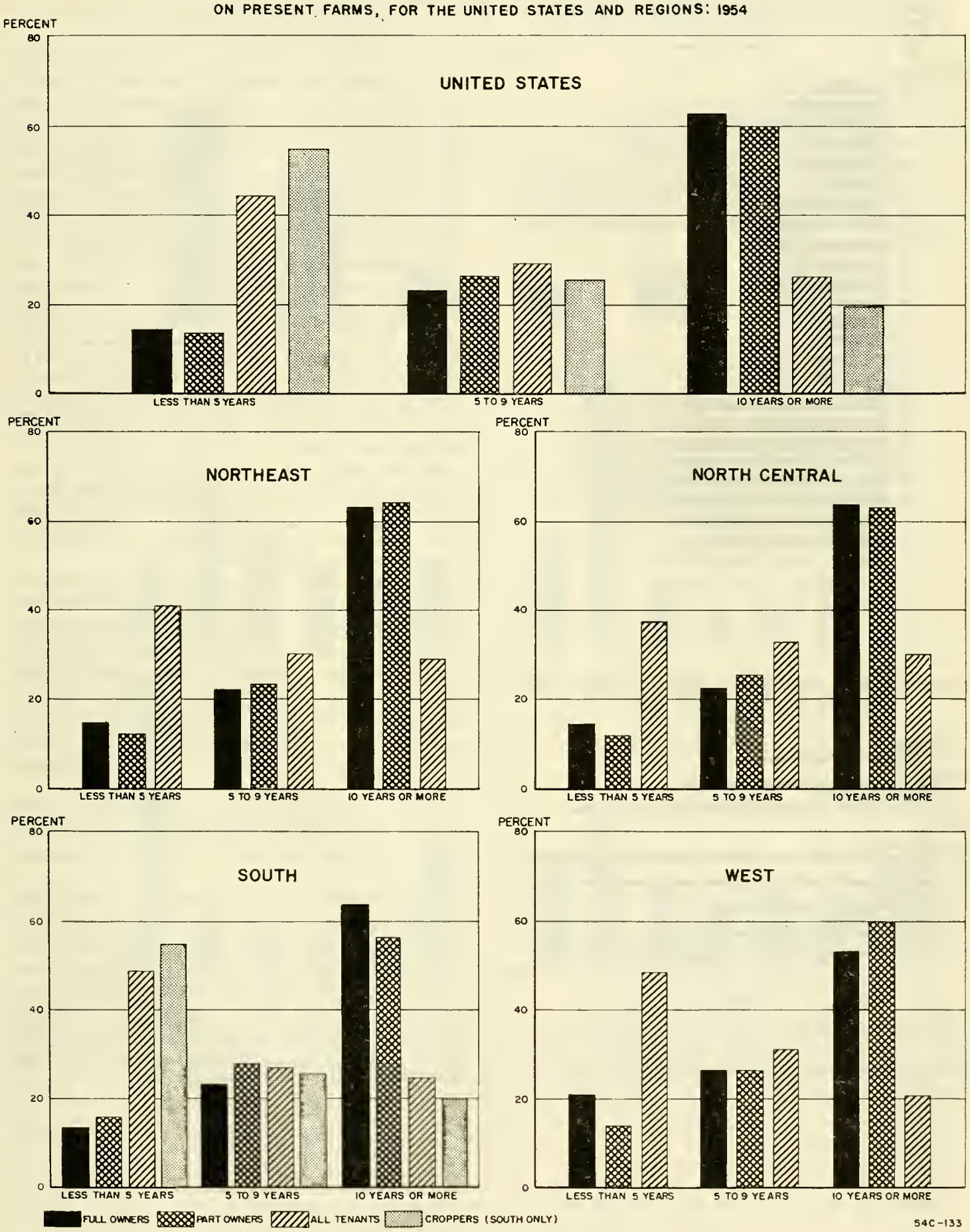
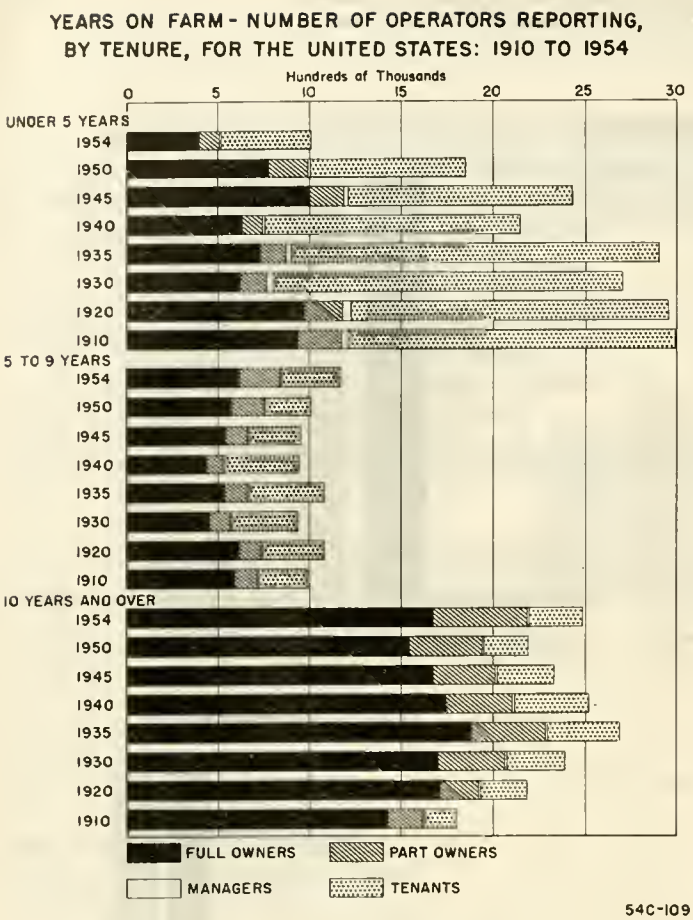


Figure 50.



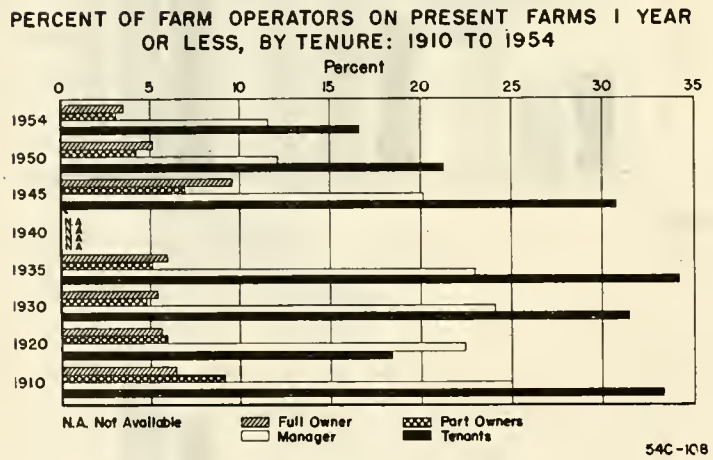


Figure 51.

of occupancy for full owners may also be attributable, in part, to age differentials. Part owners include many operators who have taken over additional land during their prime. Full owners include some operators who have semi-retired on the farm. Full owners averaged 5.6 years older than part owners.

Among the classes of tenants, share-cash tenants and other and unspecified tenants had been on their farms somewhat longer than cash tenants, share tenants, and croppers but this difference was not great and did not hold for all regions. In the North Central region, the period of occupancy of crop-share tenants was less than for livestock-share tenants, but in all other regions there was no appreciable difference. In the South, croppers reported a period of occupancy slightly less than crop-share and livestock-share tenants, who in turn reported shorter periods of occupancy than cash tenants and share-cash tenants. In the West, there was little difference among the tenant classes except for a slightly longer period of occupancy reported by share-cash tenants.

Distribution of farms by years on present farm.—More than *one-half* of all farm operators (*53.3* percent) in 1954 had been operating their present farms 10 or more years, *one-fourth* (*25.1* percent) had occupied their farms 5 to 9 years, and *one-fifth* (*21.6* percent) had been on their farms less than 5 years with *1* in *15* (*6.6* percent) reporting 1 year or less. Through the years the proportion of farm operators occupying their farms 10 years or longer and 5 to 9 years has been increasing, and the proportion on their farms less than 5 years decreasing. In 1910, more than *one-half* (*51.8* percent) of the farm operators had been on their farms less than 5 years.

Most owner-operators have occupied their farms 10 or more years. In 1954, more than *three-fifths* of the owner-operators reported occupancy of their farms for a period of 10 or more years. Only *14.4* percent had begun operation of their farms within 5 years preceding the Census. The proportions were similar for both part owners and full owners.

A high proportion of tenant-operators have occupied their farms only a short period of time. In 1954, of all tenant-operators *44.5* percent had been on their farms less than 5 years and more than *one-third* of these (*16.7* percent of all tenants reporting) had been on their farms 1 year or less. In the Northeast and North Central regions, a substantially smaller proportion of tenants than in the South or West had occupied their farms less than 5 years, a higher proportion 10 or more years. In the South, the proportion of croppers who had occupied their farms 10 or more years was lower than for tenants other than croppers. More than *one-half* of all croppers (*54.8* percent) had occupied their farms less than 5 years.

The smaller proportion of tenants than owners on present farms 5 or more years may be explained in part by age differentials, in part by greater mobility of tenants from farm to farm, and in part by farmers who leave the ranks of tenants to become owners.

Operators on present farm 1 year or less.—The greater mobility of tenant operators is also shown in the proportion of farmers who reported occupancy of their farms 1 year or less. In 1954, only *1* in *30* owner-operators (*3.5* percent of full owners, and *3.1* percent of part owners reporting) had occupied their present farms 1 year or less. Of all tenant-operators reporting year of occupancy *1* in *6* (*16.7* percent) had occupied their farms no longer than 1 year. For croppers the ratio was *1* to *4* (*24.2* percent). Some of these farm operators who had been on their farms only 1 year or less were obviously new operators, but many were operators who had moved from other farms.

PERCENT OF FARM OPERATORS ON PRESENT FARMS 1 YEAR OR LESS BY MONTH OF OCCUPANCY OCTOBER TO NOVEMBER, 1954, FOR THE UNITED STATES AND REGIONS

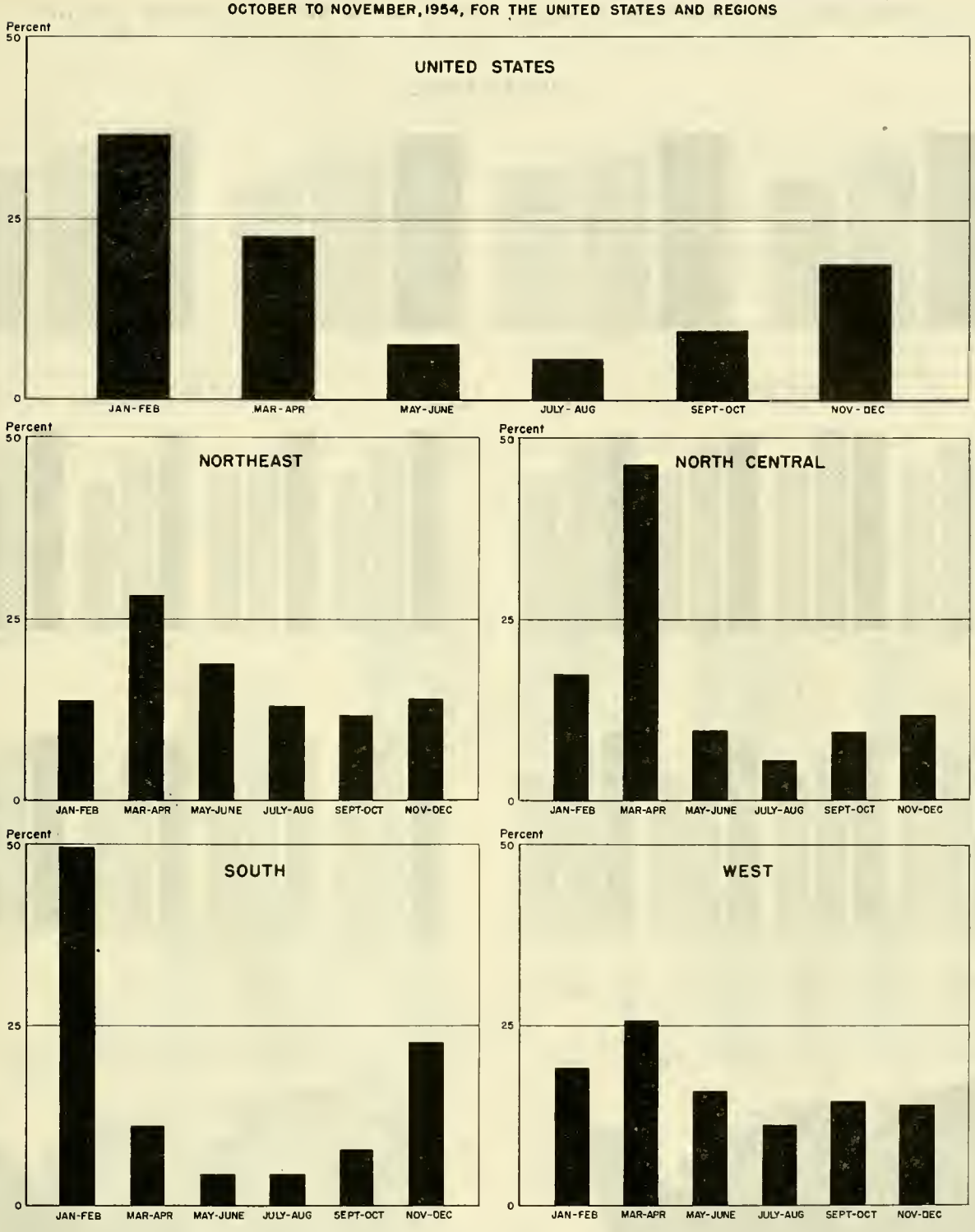


Figure 52.

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Moving dates.—The time of year farmers move is indicated by the months farm operators reported they began operating their farms. A tabulation for the 1954 Census for those farm operators who began operating their farm within a year preceding the enumeration, by bimonthly periods show that in the North Central region and in the South a high proportion of farmers move at a rather definite time of year while in the Northeast and in the West farmers move throughout the year with less pronounced peak periods. In the North Central region most farmers moved in March-April, with *46.2* percent of those who moved during the year moving in these months, followed by January-February with *17.4* percent. In the South most farmers moved in January-February, this period accounting for about *one-half* (*49.7* percent) of those moving during the year, followed by November-December (*22.6* percent).

In the Northeast most farmers move during the spring and early summer. More than *one-fourth* (*28.3* percent) of those who moved during the year moved in March-April. Almost *one-fifth* (*18.9* percent) moved in May-June. In the West most farmers moved in late winter and early spring, with a heavy movement in January-February (*19.2* percent) and reaching a peak in March-April (*25.7* percent). For the United States as a whole, January-February is the period when most farmers move (*36.7* percent), followed by March-April (*22.6* percent), and November-December (*18.5* percent).

AVERAGE AGE OF FARM OPERATORS, BY TENURE, FOR THE UNITED STATES AND REGIONS: 1940-1954

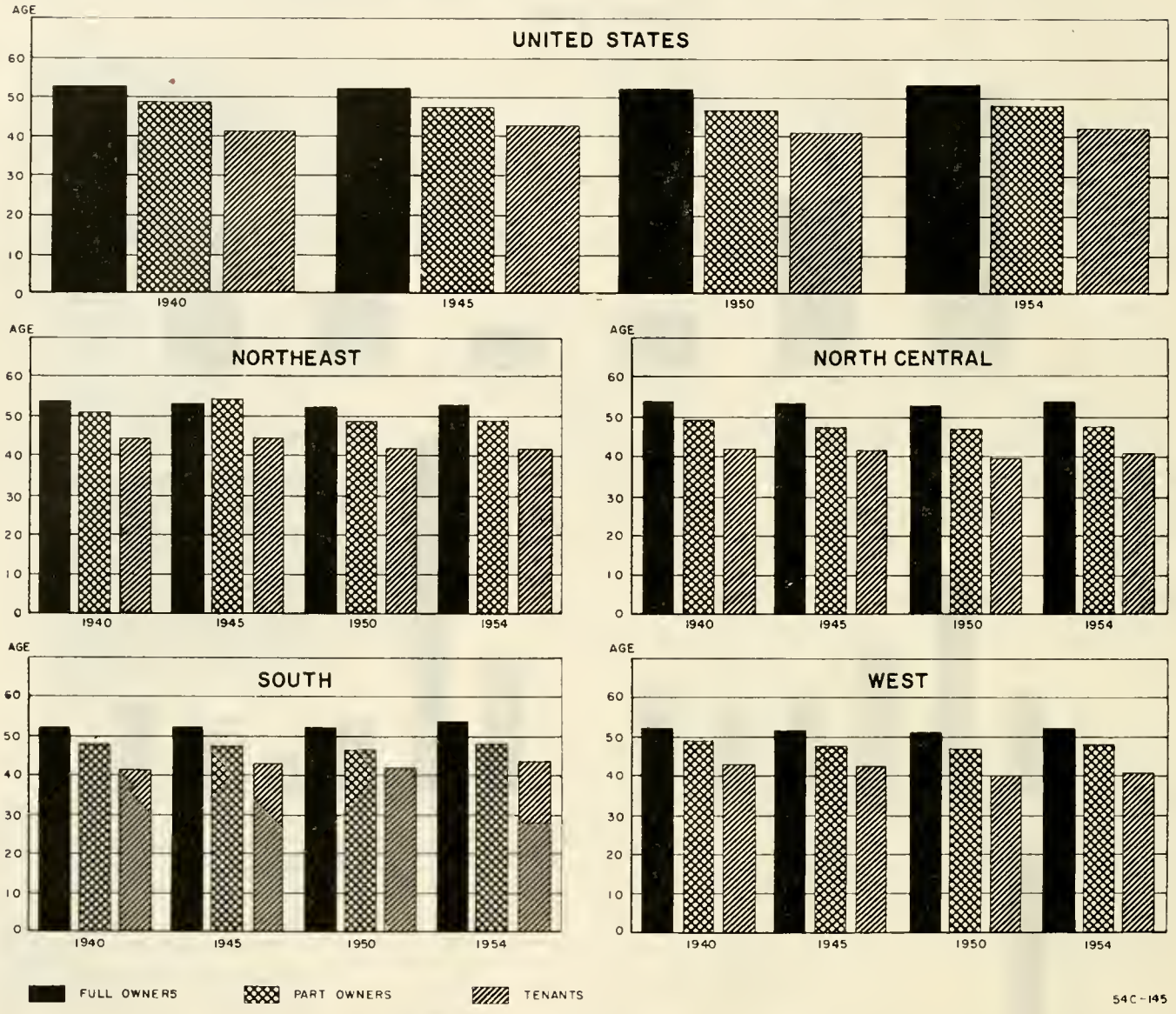
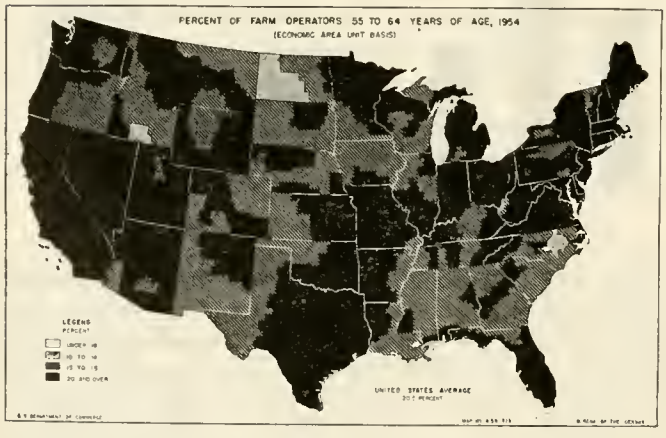
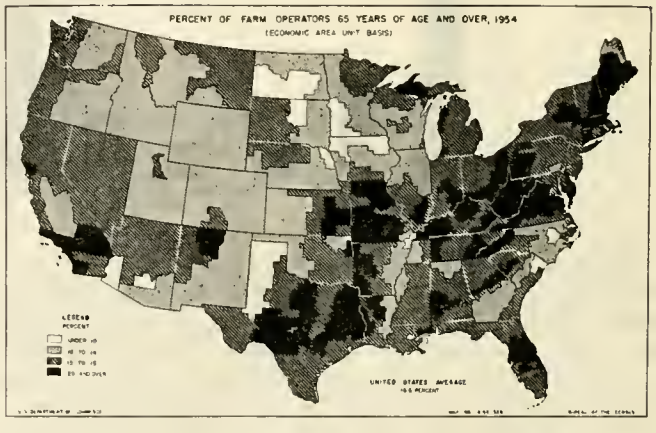


Figure 53.





AGE AND RESIDENCE OF FARM OPERATORS

Average age of farm operators.—The average age of farm operators in 1954 was 49.6 years. The high percentages of older farmers were in areas where the rate of tenancy was low and where there were relatively large numbers of residential farms (gross value of sales of farm products under $250). The average age of farm operators increased by 1.6 years from 1940 to 1954. In the South, the average age increased by 3.4 years during this period.

Tenants averaged considerably younger than owners. Many tenant-operators become owners, thus reducing the number of older operators among tenants and increasing the number of older operators among owners.

Part owners average older than tenants but younger than full owners. Operators who rent land from others to supplement land owned are generally persons who have accumulated sufficient capital and equipment to operate additional land but are young enough to have the stamina and ambition to handle the additional acreage. After passing their prime they may curtail their operations by giving up their rented land. In this instance they pass into the ranks of full owners, thus reducing the number of older operators among part owners.

A high proportion of the older farm operators are full owners. Most farm operators who are successful in achieving farm ownership, either through inheritance or purchase, do so before middle age. Also, many older owner operators remain on the farm in semiretirement. Added to these semiretired farmers are older persons retired from nonfarm employment who acquire farms and semiretire on the land.

Tenants averaged 42.2 years of age as compared with an average of 53.4 for full owners, 47.8 for part owners, and 45.3 for managers. Among the several classes of tenants, livestock-share tenants were the youngest (with an average of 38.5 years) and cash and other and unspecified tenants were the oldest (average age of 44.5 years for cash tenants and 45.1 years for other and unspecified tenants).

PERCENT DISTRIBUTION OF FARM OPERATORS IN EACH TENURE GROUP, BY AGE, FOR THE UNITED STATES AND REGIONS: 1954

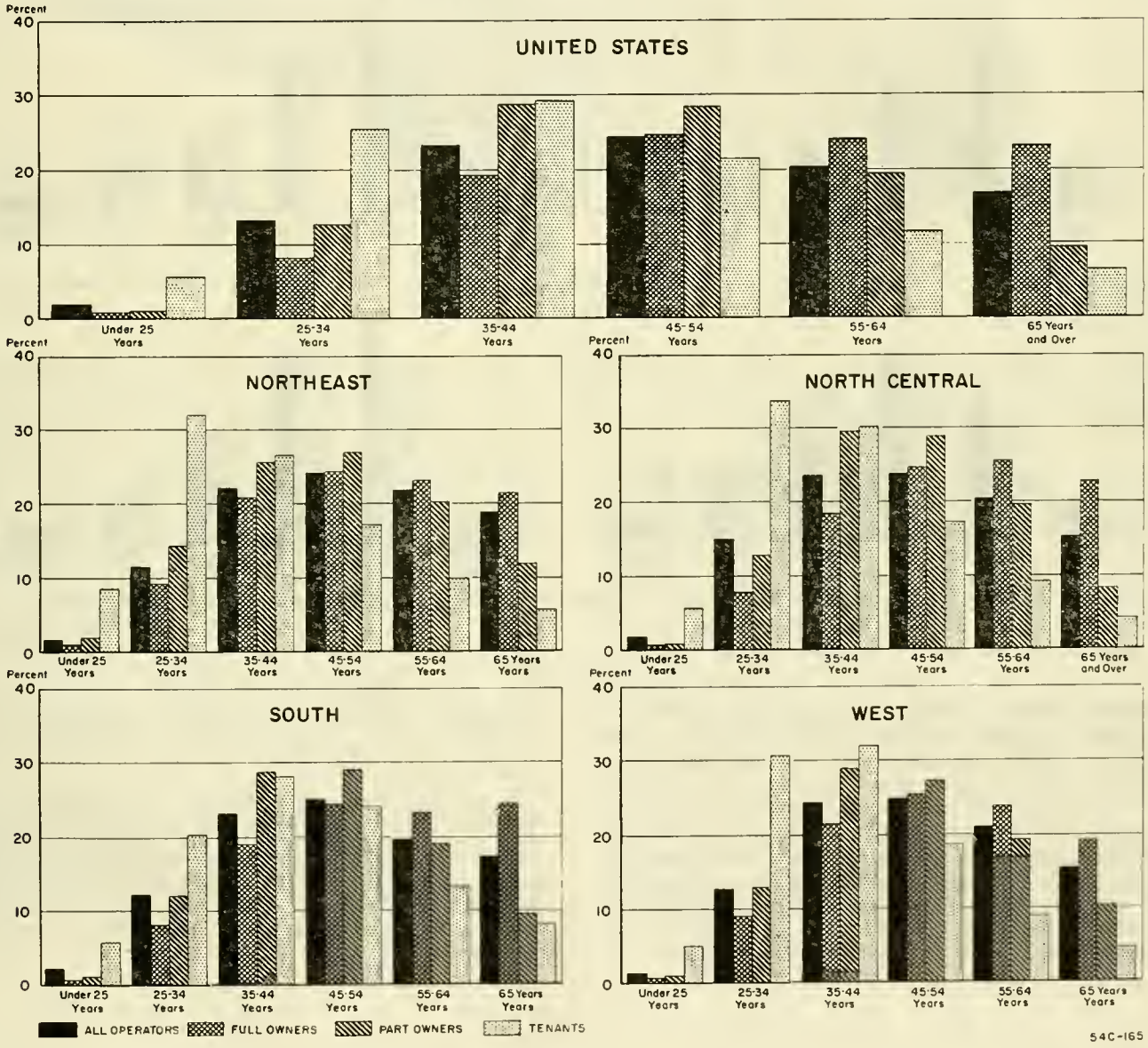


Figure 54.

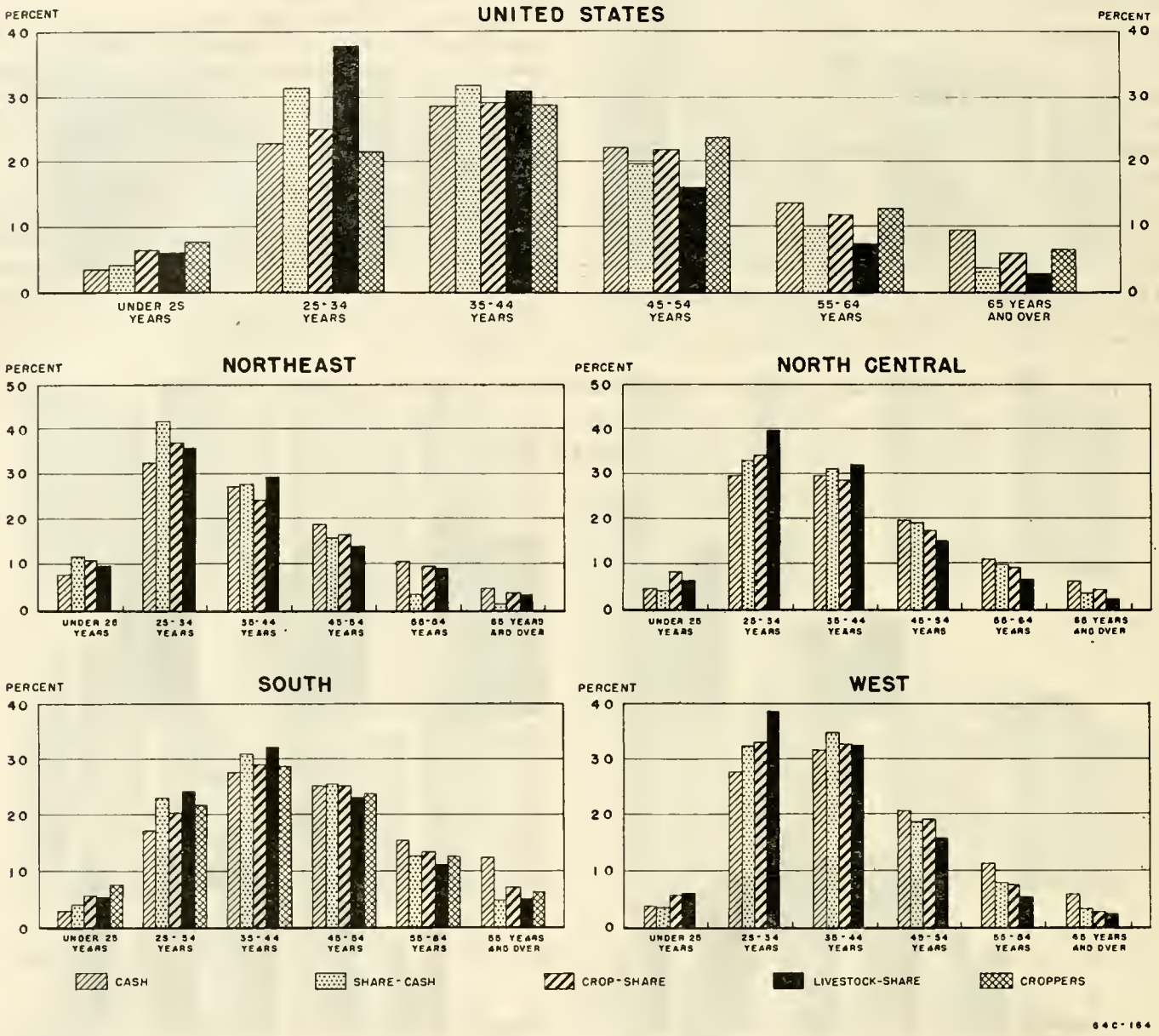


Figure 55.

Distribution of farm operators by age groups.—In 1954 nearly *one-half* of all farm operators (*48.0* percent) were 35 to 54 years of age, more than *one-third* (*36.9* percent) were 55 years old or older, and only *1* in *7* (*15.1* percent) was under 35. *One* in *6* (*16.6* percent) of all farm operators was 65 years old or over. Since 1910 the proportion of operators of intermediate age has remained rather constant, but the proportion of older operators has been increasing and the proportion of younger operators decreasing. In 1910 only 23.6 percent of farm operators were 55 years old and over and 28.9 percent were under 35. By 1954 there were only *one-half* (*50.0* percent) as many farm operators under 35 as in 1930 and only *two-fifths* (*38.8* percent) as many as in 1910. The total number of all farms in 1954 was about 25 percent lower than in 1930 and 1910.

To operate a farm today requires a much greater capital investment for machinery and equipment than a few decades ago. Also, the cost of operation is much higher, requiring large cash outlays for such items as tractor fuel, hybrid seeds, commercial fertilizers, pesticides, etc. Young men have difficulty in commanding the necessary capital to operate farms on their own account.

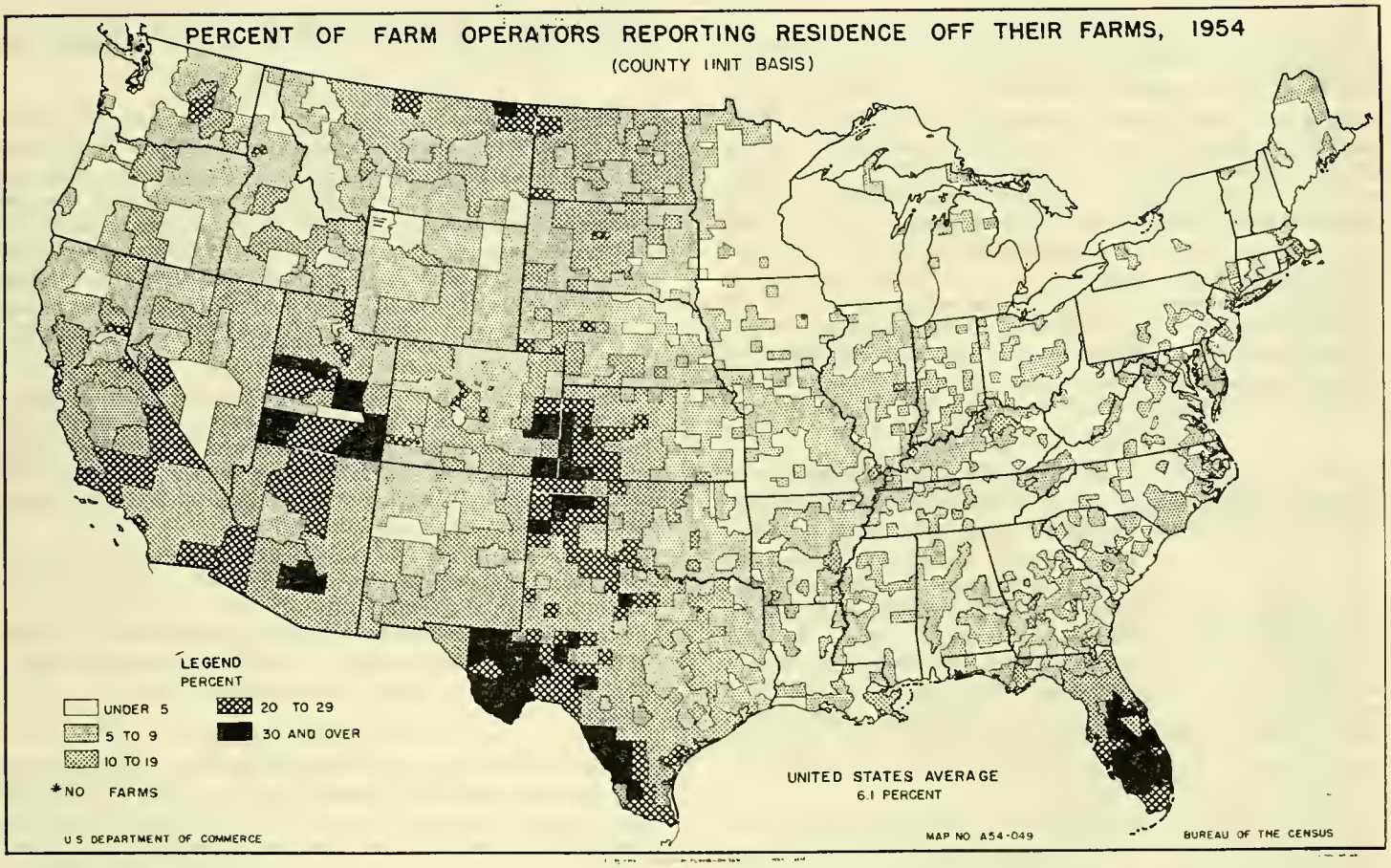


Figure 56.

Operators residing off their farms.—In 1954, 6.2 percent of the farm operators reporting as to their residence did not live on the farm operated. Some of these nonresident operators lived in rural areas near the farm operated; others, as in Utah, lived in nearby villages. In instances where the farming operations can be restricted to very limited periods of time, the operator may live at a great distance. Examples are "suit case" farming in the wheat areas of the Great Plains and fruit and vegetable farming in Florida and Texas. In areas where a large part of the work is done by the family, as in most parts of the South and the Midwest, a very small percentage of farm operators do not live on the farm.

All States east of the Mississippi River, except Florida, and those bordering the Mississippi River on the west had a rather low percentage of operators reporting residence off the farm operated. For most of this area the percentage of operators not living on the farm operated was usually less than 5. Only an occasional county had more than 10 percent of their farm operators not living on the farm operated. In Florida and from North Dakota to Texas and westward the proportion of operators not living on their farms was generally higher, with many counties having more than 10 percent of their operators living elsewhere than on the farm operated. In Florida 18.8 percent of the operators who reported as to their residence did not live on the farm they operated. For Utah the percentage was 17.2 percent and for Arizona, 16.6 percent. Texas, North Dakota, California, Montana, Kansas, New Mexico, and Nevada were next in order with 10 percent or more of the farm operators not living on their farms.

Of 67 counties with 150 or more nonresident farm operators in 1954 and with these nonresident operators comprising 20 percent or more of all farm operators in the county, 17 were in Texas, 15 in Florida, 11 in Kansas, 6 each in Oklahoma and Utah, 4 in California, 3 each in Colorado and Montana, and 1 each in Arizona and Washington. Cash grain, fruit (citrns), or cotton farms were the predominant types of farms, or comprised a high proportion of the farms in most of these counties. Livestock types predominated in the Utah counties.

Among the tenure classes, managers were outstanding in respect to the percentage of operators residing off the farm operated, with *17.1* percent not living on their farms. A somewhat higher proportion of tenants than owners resided off their farms, with *7.6* percent for tenants and *5.4* percent for owners. A slightly higher proportion of part owners than full owners resided off their farms. Among the tenants, the proportion not residing on their farms was highest for crop-share tenants, (*11.8* percent) and lowest for livestock-share tenants (*3.2* percent).

(*Continued from page 129*)

In summary, any future additions to the farmland area probably will occur in the South and the West. Much of the area now remaining in nonagricultural use can be brought into agricultural use only through the application of relatively large amounts of capital and labor. Some expansion may be made by irrigating more land in the arid parts of the West; by draining wet lands, particularly in the coastal area; and by clearing wooded areas or timber lands. The greater part of any increases in agricultural production, however, will probably come from improved management, technological advancement, and greater quantities of fertilizer, water, and improved equipment. As the quantity and variety of factors of production increase per unit of land, the tenure arrangements associated with the land probably will become more complex and more crucial in determining the level of production and the distribution of income.

(*Continued from page 130*)

Indian tribal and trust-allotted lands used for farming and grazing total 48 million acres. Of these Indian lands, 3.9 million acres are in farms and 44.1 million acres are in grazing land.

With the exception of the Western States, land in farms is held almost exclusively by individual owners. A tabulation based on a sample of approximately 200,000 farms indicated that, for the United States as a whole, 87.6 percent of the land in farms is held by individuals, 5.0 percent is held by corporations, 3.9 percent by Government, and 3.5 percent are Indian lands. The 17 Western States account for 56.6 percent of individually owned land in farms and 80.3 percent of corporately owned land. In these States most of the corporation land is used for grazing and orchard or crop-specialty farming.

Full ownership provides the maximum in security-of-use expectations and of use control over the farm operation. It provides also old-age security and a stable estate for the farm operator. High land values, in many cases, however, have necessitated large debts and/or large cash outlays which reduce capital available for equipment and for meeting current operating expenses.

As the number of farms decreases and their size increases, new ways of combining resources in production may be necessary. The division of ownership and control of the resources in farm operating units will bring forth increasingly complex tenure arrangements.

(*Continued from page 132*)

For a limited number of tenants, the form of rental payment was unspecified. It cannot be said with certainty into which group these would fall, hence their lands are portrayed in the diagram as "unspecified."

The most discernible difference shown by the distribution in 1954, as contrasted with the status in 1950, was an increase in the proportion of land in tenant-operated farms which was farmed by livestock-share tenants and a decrease in sharecropper lands.

(*Continued from page 133*)

size. Some of the additional land accumulated by part owners and by tenants represents entire farms grouped with former holdings. This tends to reduce the number of farms reported in a Census. In other cases, the added acreage represents field-rented land owned by someone who may not be able, or may not care, to purchase equipment which he cannot use to capacity. If the owner who rents out his fields retains enough land for his own use for the operation to be classified as a farm, the net effect is to maintain the number of farms but to change the proportion of farmland in the various tenure categories. Tenure changes within a State or geographic region may follow an entirely different pattern from that indicated for the United States as a whole.

(*Continued from page 136*)

any previous Census since 1890. The rate of tenancy in 1954, at *24.0* percent, was the lowest reported since 1880, the first Census for which tenancy data are available. There has been, however, a faster decline in the percentage of tenancy than in the percentage of land under lease. Part of this difference is due to the increased number of part owners and the amount of land they rent. Part-owner farms have increased consistently in numbers and in the proportion to all farms since 1940. An all-time high in number of part owners was attained in the 1954 enumeration.

(*Continued from page 137*)

units containing both owned and rented land are generally larger than full-owner or tenant farms and are frequently the result of the operator's effort to expand farm size without large immediate outlay or indebtedness. A fairly large proportion of the part-owner farms in the West originated through the leasing of rangelands for more effective operating units.

Full-owner farms are also somewhat uniformly distributed, particularly in the eastern part of the United States. There is some concentration in the southern Appalachians where productivity and prices of land are relatively low and in the eastern part of the North Central Region. Except in the South, full-owner farms are, on the average, smaller in area than those of the other tenures.

(*Continued from page 154*)

Fruit-and-nut farms require a relatively long waiting period from the time capital is invested in planting until the orchards begin to yield. This may help to explain why such a large proportion of fruit-and-nut farms are owner-operated. The *82,064* fruit-and-nut farms in 1954 were *81.7* percent full-owner-operated, *11.5* percent part-owner-operated, and *4.3* percent tenant-operated.

More than one-fifth of the commercial farms of the United States are livestock farms (other than dairy and poultry). Most livestock farms are owner-operated. Even in the areas where livestock farms predominate, a high proportion of the tenants occupy crop-share farms. In 1954, *55.3* percent of the livestock farms were run by full owners, *24.2* percent by part owners, and *19.6* percent by tenants. Of the *135,828* tenant-operated livestock farms, *33.5* percent were operated under livestock-share arrangements.

Similarly, dairy and poultry farms are predominantly owner-operated, particularly poultry farms. Only *6.4* percent of the *154,257* commercial poultry farms and *13.6* percent of the *548,763* commercial dairy farms were tenant-operated.

(*Continued from page 155*)

Tobacco was grown on 1,557,039 acres in 1954. Nine Southern States accounted for 94.1 percent of the total tobacco acreage in the United States in 1954. While the acreage has increased only slightly since 1949, the production has increased by more than 150 million pounds. The acreage of tobacco per farm is small and is subject to government controls; consequently, the value of land with a tobacco quota is relatively high. Labor requirements are large. Nearly one-half of the tobacco is grown by tenants and almost all of the tenants are either sharecroppers or crop-share tenants.

Poultry and dairy.—Poultry and dairy production tends to be more of an owner operation than does crop production. The capital investment in livestock, equipment, housing, etc., tends to be high in relation to the investment in land. Tenant commercial farms produce less than *17* percent of the chickens, less than *15* percent of the eggs, and slightly more than *20* percent of the milk.

In 1954, *3,437,491* farms reported *383,970,844* chickens 4 months old and over. Compared to other enterprises, the proportion of noncommercial farms reporting chickens is high—about *30* percent. Probably a large share of these farms are retirement or part-time farms. The number of commercial poultry farms represents only *4.5* percent of all farms reporting chickens; however, these poultry farms accounted for *64.3* percent of the value of all chickens and eggs sold. Chickens and eggs are commonly a supplemental enterprise on other types of farms. Cash leasing is more important in chicken and egg production than it is in either livestock (other than dairy) or crop production, but even so, all types of tenancy combined accounted for but a small percent of the total value.

The number of farms reporting milk cows has declined from *3,681,627* in 1950 to *2,956,900* in 1954. The number of milk cows reported in 1954 was *20,365,450*, about 1 million less than in 1950. Yet total milk production has increased about *4.5* percent in the period 1950–54. Of the farms reporting milk cows, *73.3* percent were commercial farms divided as follows: *36.1* percent, full owners; *18.7* percent, part owners; *0.3* percent, managers; and *18.2* percent, tenants; the remaining *26.7* percent were noncommercial farms.

Cattle and hogs.—In 1954, *95,634,676* cattle and *57,912,006* hogs were reported on farms. Cattle numbers had increased by more than *18* million and hog numbers by *1.6* million since 1950.

The length of the production process may influence the type of tenure. Although the differences are not large, perhaps the effect of the length of the production cycle may be illustrated by comparing cattle to hog production. Figure 26 shows, for example, that tenant farms produce a greater share of the value of hogs and pigs than of cattle. In 1954, *32.5* percent of the hogs, but only *17.0* percent of the cattle, were reported on tenant commercial farms. Of the commercial tenant farms *67.9* percent reported cattle and *58.7* percent reported hogs.

(*Continued from page 161*)

croppers. Commercial cropper farms in the South averaged *36.9* acres and noncommercial cropper farms averaged *21.0* acres in 1954.

With the exception of tenants in the South, the average farm size of any given tenure group is smallest in the Northeast and largest in the West.

From the standpoint of production it is useful to separate the commercial farms from other farms. These "other" farms in 1954 numbered *1,455,404* and contained *127,577,554* acres, with an average size of only *87.7* acres, whereas the average commercial farm contained 310.3 acres. By tenure, the average size of commercial farms for full owners was *207.3* acres; part owners, *609.5* acres; managers, *3,436.1* acres; and tenants (excluding croppers) *238.2* acres. Commercial manager-operated farms were smaller than "other" manager farms which averaged *11,958.6* acres in 1954. The "other" manager farms were large because they were predominantly institutional farms such as experiment stations, county farms, grazing associations, etc. The average size of commercial farms increased *34.7* acres or *12.6* percent between 1950 and 1954, whereas the average size of "other" farms increased only *4.9* acres or *5.9* percent.

Of the tenant-operated commercial farms in 1954, cash tenants had an average farm size of *349.3* acres and tended to be the largest; and croppers, with an average farm acreage of *36.9*, the smallest. Share-cash farms averaged *285.6* acres; crop-share, *176.6* acres; livestock-share, *270.0* acres. All types of tenant farms, with the exception of sharecropper farms, have increased in size since 1950.

(*Continued from page 165*)

number of workers on commercial full-owner farms reporting in the United States was *2.3;* on tenant farms, *2.5;* on part-owner farms, *3.0;* and on manager farms, *9.8*. For average number of workers on commercial farms see table 5. The labor figures for 1954 relate to September 26–October 2 for 33 States and October 24–30 for 15 States. The specified week represented peak or near-peak period of employment for many areas.

Although commercial manager-operated farms employed the largest number of persons per farm, they employed only *2.1* percent of the total workers on commercial farms. In 1954, *42.4* percent of the persons employed on commercial farms were on full-owner farms, *27.3* percent were on part-owner farms, and *28.2* percent were on tenant farms.

On commercial farms the number of family workers, including the farm operator, per farm reporting in 1954 was *1.8* for part owners and tenants and *1.6* for full owners. Manager farms employed an average of only *1.3* family workers per farm reporting. The larger differences between tenures in terms of employment are in number of hired workers. Manager-operated commercial farms hired *12.2* workers per farm. Of these hired workers about one-half were regular workers (employed 150 or more days a year) and one-half were seasonal workers. About *72* percent of the hired workers on full- and part-owner commercial farms and about *86* percent of the hired workers on tenant commercial farms were seasonal employees.

Only about one-sixth of the commercial tenant farms—*16.3* percent—reported hired workers in 1954. The average number of hired workers per farm—based on all commercial tenant farms—was *0.6*, as compared with an average of *3.9* persons for those tenant farms reporting hired workers.

Expenditures for farm labor.—The total outlay for hired farm labor reported by commercial and noncommercial farms for 1954 in the Census of Agriculture was *$2,279* million. This is *$139* million less than was reported for hired labor in 1949. As may be expected, most of the outlay for hired labor (*97.2* percent) was made by commercial farms. Of the total expenditure for farm labor made by commercial farms in 1954, *37.8* percent was spent by full owners, *36.0* percent by part owners, *16.6* percent by tenants, and *9.6* percent by managers. Since manager-operated farms represented less than one-half of one percent of all the farms and accounted for *9.6* percent of the total outlay for hired farm labor, the per farm expenditure was high. As seen in figure 36, manager-operated farms dominate an array of average farm expenditures. The importance of labor expenditure by the other tenure groups lies in the aggregated expenditure of many farms with one, two, or three hired workers.

(*Continued from page 168*)

number of balers reported was *195,858*. The increases between 1950 and 1954, therefore, were *131.1* and *128.7* percent, respectively, for farms reporting and numbers of balers.

Noticeable differences are reported in proportions of farms reporting the various specialized machines. Much of this difference, of course, is due to the type of farming. The ratio of farms reporting corn pickers, for example, is higher in all tenures in the North Central than in any other region. The dairy-dominant Northeast had a much higher proportion of its farms reporting milking machines. Whether measured extensively in terms of work power or intensively in terms of specialized machines, the South has a smaller degree of mechanization than the other regions.

In general, the part-owner and tenant-operated farms have the greatest degree of mechanization. To the extent that tenancy is a means whereby part owners and tenants can expand their operations without investing their limited capital in land, tenure arrangements are conducive to larger, more mechanized farms. Tenants in the South, however, are an exception for they have a smaller proportion of their farms mechanized than any of the other tenures. Only *14.0* percent of croppers in the South reported a tractor. By definition of croppers, work power is furnished by the landlord.

Part-owner farms tend toward greater mechanization and show the highest proportion of farms reporting most types of machines. The part-owner tenure is characterized by operators who are in a financial position which permits them, within limits, to choose between greater land ownership and expanding their operations with more equipment on rented land.

(*Continued from page 169*)

Although a smaller proportion of farms in the West reported the use of fertilizer than in the other regions, they reported a larger expenditure per acre. In the West, slightly more than *40* percent of the farms reported fertilizer use, compared with almost *70* percent of the farms in the United States reporting fertilizer use. Commercial cash tenants in the West reported the highest average expenditure per acre for fertilizer, *$21.39;* this compares with *$9.97* per acre reported for all cash tenants in the United States.

(*Continued from page 170*)

irrigation equipment, or if the supervisory and/or compensation problems are complicated. As an alternative example, if production expenses are large and sharing arrangements can be developed easily, a share tenancy might be appropriate.

Specified cost items.—The four specified expense items shown by tenure in figure 41 illustrate the differences in expenditures associated with various forms of tenure. The differences in type of farm and size of farm related to tenure should be kept in mind, however, so that not all of the variation in expenditure is attributed to the form of tenure alone.

Two expense items that are relatively important in the budgets of manager farms are, as expected, hired labor and feed for livestock and poultry. The average expenditure in 1954 for hired labor was *$14,074* per farm reporting for commercial manager farms; part-owner farms were the next highest with an average of *$1,565*. Full owners and tenants on commercial farms spent only *$973* and *$657* per farm, respectively, for hired labor. In 1954, managers spent *$9,256* per commercial farm reporting for feed; whereas, full owners spent an average of only *$1,482;* part owners, *$1,550;* and tenants, *$1,092*.

The relative size of farms of the various tenure groups, i. e., from the large manager farms to the small full-owner farms, may account for the array of per farm expenditures for petroleum products. Other factors affecting expenditure that are related to tenure are type of farm and the geographic area. Commercial manager farms reporting in 1954 spent for gasoline an average of *$1,899;* part owners, *$686;* tenants, *$472;* and full owners, *$380*.

(*Continued from page 174*)

cent, by tenants. Of Class I farms (the class representing the highest gross incomes), *35.2* percent were operated by full owners; *38.2* percent, by part owners; *4.4* percent, by managers; and *22.2* percent, by tenants. In each of the intermediate classes, approximately *30* percent of the farms were operated by tenants.

These relationships held, in general, for each region. In the South however, there were relatively fewer full owners and more tenants in the lower economic classes than in the North and West. In the South, the proportion of farms operated by full owners was not appreciably higher for economic classes representing intermediate incomes than for economic classes representing higher incomes. In the South, the highest proportion of tenancy was in Economic Class IV farms, with the proportion decreasing with each higher and with each lower class. In the North and West, the situation was almost the opposite with the highest proportion of tenancy in Economic Class II in the North, and Class I in the West, and the proportion decreasing with each lower class.

(*Continued from page 176*)

The difference in the proportion of full owners and part owners reporting the specified facilities was not great for any region. For the Northeast, the North Central region, and the South, the percentages were somewhat higher for part owners on commercial farms than for full owners. For the West, the percentages for part owners were slightly less than for full owners.

For all regions, the percentage of managers reporting telephone and running water, respectively, was higher than for any other tenure group. In the North Central region and the South, the percentage of managers reporting electricity was higher than for other tenures. In the Northeast, the percentage of managers reporting electricity was less than for part owners and in the West, less than for all owners.

DIRECTORY OF TENURE DATA, 1954 CENSUS

Where found	Geographic area for which available	Period	Classification	Subjects covered	Basis of tabulation of 1954 data
Volume I, State Table 3	State	1920 to 1954	Color-tenure	Farms, land in farms, cropland harvested and, for the South, one or more specified crops.	Sample.
State Table 4	State	1954	Commercial farms by tenure (color-tenure for the South).	Farms, land in farms, land use, value of land and buildings, specified operator characteristics, specified facilities and equipment, farm labor, specified farm expenditures, principal livestock, and specified crops.	Sample.
State Table 5	State	1920 to 1954	Race	Farm operators	Complete count.
State Table 9	State	1954	Commercial farms by tenure (color-tenure for the South).	Hired labor and wage rates	Sample.
County Table 2	County and State	1954 and 1950	Color	Farms	Complete count.
			Tenure	Farms, land in farms, and cropland harvested	Complete count.
County Table 2a	County and State (the South only and 7 counties in Southeast Missouri).	1954	Color-tenure	Farms, land in farms, and cropland harvested	Complete count.
Economic Area Tables 7, 8, 9.	Economic areas and State	1954 and 1950	Commercial farms, by tenure	Farms, land in farms, land use, value of land and buildings, specified operator characteristics, specified facilities and equipment, farm labor, specified farm expenditures, principal livestock, and specified crops.	Sample.
Volume II, Chapter II:					
Table 6	United States	1910 to 1954	Tenure	Age of operator	Sample.[1]
Table 7	The South	1910 to 1954	Color-tenure	Age of operator	Sample.[1]
Table 8	United States, the North, the South, and the West.	1954 and 1950	Commercial farms by tenure (color-tenure for the South).	Age of operator	Sample.
Table 9	United States	1940 to 1954	Tenure	Residence of operator	Sample.
Table 10	The South	1940 to 1954	Color-tenure	Residence of operator	Sample.
Table 11	United States, the North, the South, and the West.	1954 and 1959	Commercial farms by tenure (color-tenure for the South).	Residence of operator	Sample.
Table 12	United States, the North, the South, and the West.	1954 and 1950	Commercial farms by tenure (color-tenure for the South).	Years on present farm	Sample.
Table 13	United States	1910 to 1954	Tenure	Years on present farm	Sample.[1]
Table 14	The South	1910 to 1954	Color-tenure	Years on present farm	Sample.[1]
Table 16	United States	1934 to 1954	Tenure	Off-farm work	Sample.
Table 17	The South	1934 to 1954	Color-tenure	Off-farm work	Sample.
Table 18	United States, the North, the South, and the West.	1954 and 1949	Commercial farms by tenure (color-tenure for the South).	Off-farm work and other income	Sample.
Table 20	Divisions and States	1954	Tenure (color-tenure for the South).	Age of operator	Sample.[1]
Table 22	Divisions and States	1954	Tenure (color-tenure for the South).	Residence of operator	Sample.
Table 24	Divisions and States	1954	Tenure (color-tenure for the South).	Years on present farm	Sample.[1]
Table 27	Divisions and States	1954	Tenure	Off-farm work and other income	Sample.
Chapter IV:					
Table 5	United States, the North, the South, and the West.	1954 and 1950	Tenure (color-tenure for the South).	Farm wage rates	Sample.
Table 16	United States	1930 to 1954	Cash tenants	Cash rent paid; also farms, owned and rented land, land in farms, cropland harvested, and value of land and buildings.	Sample.
	The South	1954 and 1940	Nonwhite cash tenants	Cash rent paid; also farms, owned and rented land, land in farms, cropland harvested, and value of land and buildings.	Sample.
Table 17	United States, the North, the South, and the West.	1954	Cash tenants by type of farm	Cash rent paid; also farms, owned and rented land, land in farms, cropland harvested, and value of land and buildings.	Sample.
Table 33	Divisions and States	1930 to 1954	Cash tenants	Cash rent paid	Sample.
		1954	Cash tenants	Farms, rented land, land in farms, value of land and buildings.	Sample.
Table 34	Divisions and States	1950 and 1954	Cash tenants by commercial and other.	Cash rent paid	Sample.
		1954	Cash tenants by commercial and other.	Farms, rented land, land in farms, value of land and buildings.	Sample.
Table 35	The South only, divisions, and States.	1954 and 1940	Cash tenants by color	Cash rent paid	Sample.
		1954	Cash tenants by color, by commercial and other.	Cash rent paid, farms, rented land, land in farms, value of land and buildings.	Sample.
Chapter X:					
Table 1	United States	1880 to 1954	Tenure	Farms	Complete count.
Table 2	United States	1900 to 1954	Nonwhite by race (Negro and other).	Farms	Complete count.
Tables 3,4	United States and the South	1880 to 1954	Tenure	Farms	Sample.
		1900 to 1954	Color-tenure	Farms	Sample.
Tables 5, 6	United States and the South	1900 to 1954	Color-tenure	Land in farms	Sample.
Tables 7, 8	United States and the South	1950 and 1954	Tenure (color-tenure for the South).	Value of land and buildings	Sample.
		1900 to 1945	Color-tenure	Value of land and buildings	Sample.
Tables 9, 10, 11, 12.	United States and the South	1924 to 1954	Color-tenure	Cropland harvested and other specified land-use items.	Sample.
Tables 13, 14.	United States and the South	1900 to 1954	Color-tenure	Summary uses of land	Sample.
Table 15	Summary for 20 States	1929 to 1954	Tenure	Irrigated land	Sample.
Tables 16, 17.	United States and the South	1925 to 1954	Tenure (also nonwhite by tenure for the South).	Owned and rented land	Sample.
Tables 18, 19, 20.	United States and the South	1950 and 1954	Commercial and other farms by tenure (also nonwhite by tenure).	Farms and farm characteristics in considerable detail.	Sample.
Tables 21, 22.	Divisions and States	1945 to 1954	Tenure, with nonwhite by tenure for the United States and the South and nonwhite totals for the North and West.	Farms, land in farms, land use, value of land and buildings.	Sample.

See footnote at end of table.

DIRECTORY OF TENURE DATA, 1954 CENSUS—Continued

Where found	Geographic area for which available	Period	Classification	Subjects covered	Basis of tabulation of 1954 data
Volume II, Chapter X—Con.					
Table 23	Divisions and States	1880 to 1954	Tenure	Farms	Complete count.
		1900 to 1954	Tenure and color	Farms and land in farms	Complete count.
Tables 24, 25, 26, 27.	Divisions and States	1950 and 1954	Tenure	Owned and rented land	Sample.
Table 28	Divisions and States	1900 to 1954	Nonwhite by race (Negro and other).	Farms	Complete count.
Tables 29, 30, 31, 32, 33, 34, 35.	Regions and States	1950 and 1954	Commercial farms by tenure	Farms, land in farms, cropland harvested, value of land and buildings, and other specified farm characteristics, such as facilities, equipment, farm labor, expenditures, livestock, and crops.	Sample.
Table 36	Divisions and States	1950 and 1954	Farms other than commercial by tenure.	Farms (*See* Volume II, page 948, for method for obtaining data for additional items).	Sample.
Tables 37, 38.	Divisions and States	1954	Part-time and residential farms by tenure.	Farms	Sample.
Volume III, Part 1	Summary for multiple-unit areas and States.	1954 and 1950	Tenure of multiple units	Multiple units, subunits (Census farms), land in multiple units, specified crops, horses and mules.	Complete count.
			Class of tenants of multiple-unit operators.	Farms	Complete count.
Part 5	United States, divisions, and States.	1930 to 1954	Tenure	Farm-mortage debt	Survey sample.

[1] Average age and average years from complete count.

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